

The Iron Age

A Review of the Hardware and Metal Trades

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Wood Working Machinery.

There are few interests in America so extensive or important as the wood-working industry. The great extent of our forests has permitted a lavish use of lumber for the many purposes of life, such as would not be thought of in countries where timber is scarce, and consequent upon the general adoption of wood has been the introduction and improvement of machines for its manufacture. In this country almost every village of two thousand or more inhabitants supports a saw and planing mill, and frequently a regular wood working manufactory furnished with appliances for planing, boring, mortising, tonguing and grooving, plain and scroll sawing, etc. America has accordingly taken the lead of other countries in wood working machines, and although they are sometimes of a less durable character than English machines, are nevertheless generally superior to them in effectiveness, first cost, and economy of operation.

The first manufactory of wood-cutting machines was established only 78 years ago, in London, by Sir Samuel Bentham, who seems to be the founder of the business. His efforts resulted in giving the business a decided impetus. It may be seen that considerable proficiency was rapidly attained in the business, by the fact that by 1800 there had been introduced the rotary planing and molding machine, the segmental circular saw, the conical cutter for dovetail grooves, the undulating carriage to form wave moldings, the compound cutter head to work two or more sides of lumber at once, tubular boring implements, the reciprocating and rotary mortise machines, the radius arm for sawing segments, the tracer guide for sawing irregular forms, the grooving table, the pivoted table for mortising machines, the forked or double mortise chisel, the rotary cutter for forming screw threads on wooden screws, double grooving saws, the rack feed for planing machines, and many other appliances. Indeed, more was accomplished in England previous to 1815, than was effected for thirty-five years afterward. Matters had not, however, remained at a standstill in America, for during the great exhibition of 1851, in London, a number of American machines were displayed and their performances created great astonishment in the minds of English engineers. From this date, wood cutting machinery, especially on this side of the water, advanced rapidly to a high degree of excellence.

Among the most important considerations respecting the use of this kind of machinery is the great variation in the density of the material to be wrought. Wood varies in hardness, from the soft fir timber of the northern climates, to the harder varieties of box wood, ebony and lignumvitae. Great variations again occur with reference to the grain of the various woods, and the presence or absence of knots in their constitution. The tools and cutters which work these many varieties must be peculiarly fitted for the woods on which they are used. Here lies a very important difference between wood and metal working machinery.

Another peculiarity of wood-working machinery is the speed at which the parts must move, and allowance must be made in the construction of the machine for the centrifugal

years." A machine must therefore be constructed rather with a view to economy than great durability.

The following premises laid down by Richards, in the work previously quoted, exhibit very clearly the principles which underlie the operation of wood-working machinery:

"First—The object of machines in wood work, as contrasted with hand labor, is to augment force, to guide cutters in true lines, and secure a greater rapidity of movement.

"Second—The direct effect of machines is as the amount or length of cutting edge that can act in a given time.

"Third—This effect or result is limited by the nature of the operations, and by the accessibility of the surfaces of the material to be acted upon.

adjustment have been kept in mind. Among some of the most important improvements on this machine, may be mentioned that the feed rolls are geared at both ends, represented in a smaller engraving. The gears at each end of the feed roll are connected with rods running across the machine, and are also made fast to the frame on both sides, thus preventing any cramping of the gears. Where gears are used on only one end of the feed rolls, a lifting action is produced which causes the board to be fed through in an oblique direction. This difficulty is avoided by gearing the feed rolls at both ends, causing an equal pressure on both edges of the board, feeding it through straight; the gears wear even, and are more than twice as durable.

frame moldings, dressing narrow boards, sheathing, etc. It has wrought iron slotted cutter heads and patent self-oiling boxes. Among the more important improvements claimed for this machine over all others, is the manner of connecting the top cutter head boxes together by a yoke passing underneath the head of the machine, instead of over the top, thus giving free access to set and sharpen the cutters. The importance of having the boxes tied together in some manner, so as to keep the boxes in line and to avoid cramping and twisting of journals, is apparent to any mechanician. The patent adjustable pressure bar in front of the top-cutter head, and the hinged pressure bar back of the head, with the patent double-gearred feed, works, make it a most com-

cylinder boilers, which afford the motive power to the blast and hoisting engines of the blast furnace. Beside the pig iron sold for foundry purposes, there has been made the past year 37,284 net tons of railroad iron, the value of the entire product figuring up to the round sum of \$3,000,000. 17,000 tons of old rails have been wrought over the past year at these works.

The iron made from the Iron Ridge ore is of superior value in manufacturing rails when combined with a due proportion of that from the mines of the Lake Superior country, the proportions being three-eighths of the Iron Ridge. Of the ore used 22,000 tons are brought from Escanaba in vessels direct to the company's docks, and 40,000 tons from Iron Ridge on the St. Paul Railroad direct to the works. The

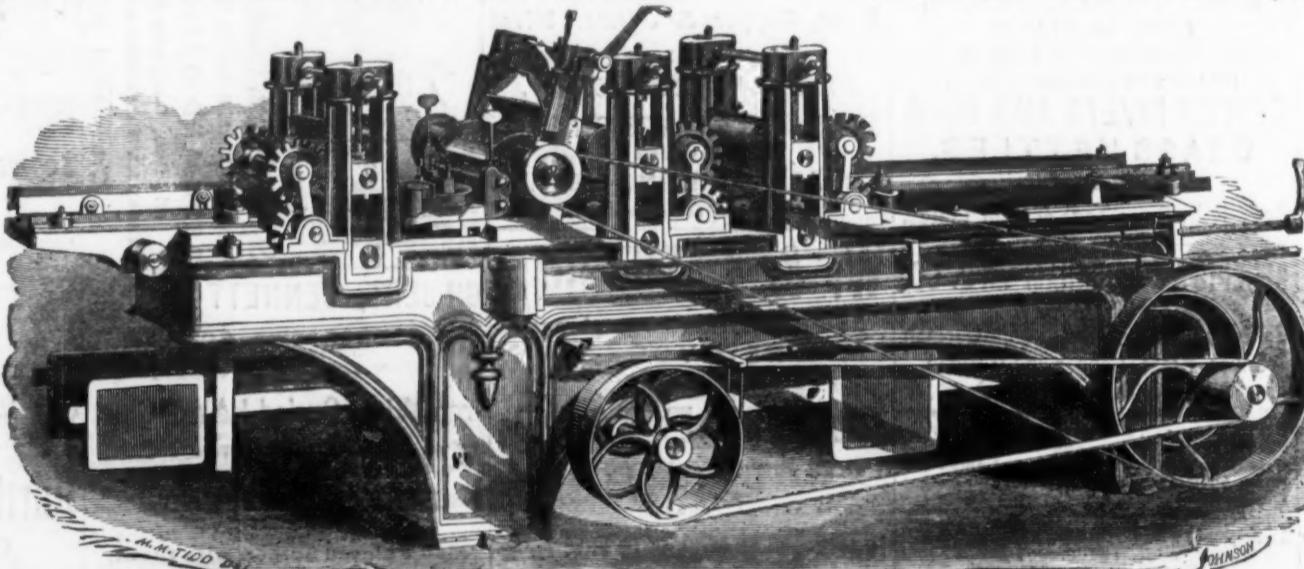
company owns two-fifths of the Iron Ridge mines. The balance is owned by the proprietors of the Chicago mills and those at Wyandotte, Michigan. The ores brought from the Lake Superior country are purchased at the mines near Negaunee, and shipped in vessels from Escanaba. The company thus has the advantage of being enabled to select such ores as are best adapted to the manufacture of railroad iron. A number of vessels are employed during the season of navigation in transporting this ore from Escanaba, and 140 cars are in constant use bringing ore from Iron Ridge and for use in the yards and on the dock, which is 1400 feet in length. The pile of ore now on the ground for winter use is immense, while the cars are daily bringing from Iron Ridge that which goes into immediate use. There is also piled up at the works vast piles of coal and coke for the use of the establishment. Of this there was used last year 55,000 tons of bituminous coal brought from Ohio, 25,000 tons anthracite from Pennsylvania, and 20,000 tons coke from Connellsville, Pa.

The two former are brought by water and the latter by rail, obtaining cheap freight by grain vessels and stock cars on their return trips.

A top and bottom mill has just been completed, by the aid of which the production of rails will be increased yearly 9000 or 10,000 tons. The engine put up in this mill is of 34x36 cylinder, is a very superb one, from the works of Jackson & Wiley, Detroit. It has a forty ton fly-wheel, which makes seventy-five revolutions a minute. There are six heating furnaces, with a steam boiler to each, two more to be added in the spring; also a Stillwell beater and two pumps.

To operate these extensive works a large amount of machinery is requisite, aside from that named above, and it has been furnished chiefly by the machine shops and foundries of Milwaukee. There are in all forty-two steam boilers in the old mill; two blowing engines, operated by steam, for the blast furnaces, and there are seven pairs of shears for cutting both hot and cold iron; two trains of puddle rolls; a train for rolling rails and two for tops and bottoms; saws for cutting rails; steam hammers; six fan blowers; two Burden rotary squeezers; rail straighteners; steam punches and slotters; apparatus for cutting up old rails, and other numberless massive implements driven by steam.

The company owning and operating this business was incorporated by charter about six years since with a capital of \$250,000, which has since increased to \$1,500,000, using beside capi-



PLANING AND MATCHING MACHINE.

"Fourth—This limit of application governs the relation of machine to hand labor, and whenever hand manipulation approaches what can be done with machines, they should not be used, and cannot with profit be applied."

As in the case of other machines, the framing of wood machines must be disposed so as to meet the strains, to connect and support the details of the machine, and in many instances support the material also. When, however, the high speed at which such machinery is run is taken into account, in connection with the various other strains to which the machinery is subjected, the matter becomes complicated and the proper construction of the frame a difficult question.

In arranging the frames of wood machines, then, it is absolutely necessary that a firm connection be secured between the cutter spindles and lumber supports. In rotary machines the requirements of symmetry usually furnish sufficient strength in most parts of the framing; but in reciprocating machines, such as sawing and mortising machines, a remarkable strength is required when the work to be performed is considered. This arises from the necessity of counteracting the effect of inertia in the reciprocating parts.

The "chip breaker," or "clip," is represented in another engraving, and is hinged on the side cutter head frame, working on the same principle as the top pressure bar, which prevents all splitting of the edges of boards; and, holding the "stuff" close by the cutters, enables the machine to be fed, it is claimed, 20 per cent. faster than any other machine. The under cutter head is attached near the end of the machine, so that it is easily accessible for changing or sharpening. The table is hinged so that it can swing around, giving easy access to the under cutters. It is also provided with suitable adjustable "rest bars," or bed plates.

The machines have also a swivel guide for matching tapering lumber. This attachment

can be applied to any sized machine in a strong,

substantial manner; and with this attachment

the machine will work stuff tapering 6 in. or

more in a length of 10 ft. The bed plate, di-

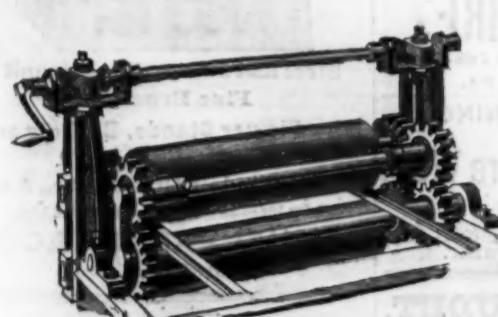
plete machine for all kinds of molding work.

The surface planer manufactured by this company illustrates another department of wood machinery. It is provided with two pairs, of feed rolls, the feeding-in pair being 6 inches in diameter, and furnished with the patent expansion gearing on both ends of the rolls, thereby making a strong and uniform feed. The carrying-out rolls are 4 inches in diameter, and are strongly geared. The top feed-roll is held down by means of heavily weighted levers. The stuff is also fed over a solid bed plate, and the cutter-head is provided with the hinged pressure bar above described, thus holding the lumber firmly upon the bed plate in front of the cutter. This method possesses great advantages over the lag planer, in which the constant friction and uneven wear of the lags would in a short time render a lag planer unreliable for producing smooth work and even thickness on lumber.

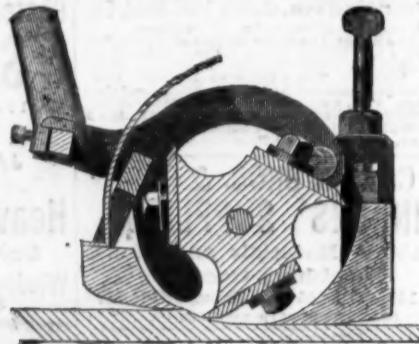
The Milwaukee Iron Company's Rolling Mill.

The correspondence of the Chicago *Inter-Ocean* says, respecting these works: They are situated at Bay View, a suburban village on the bay shore, near Milwaukee.

The location was well chosen. It is only 45 miles from the Iron Ridge, and deeply laden vessels can come within a few rods of the mills, while the facilities for shipping the products



EXPANSION GEARING AS APPLIED TO FEED ROLLS.



HINGED PRESSURE BAR AS APPLIED TO SURFACE CUTTERS.

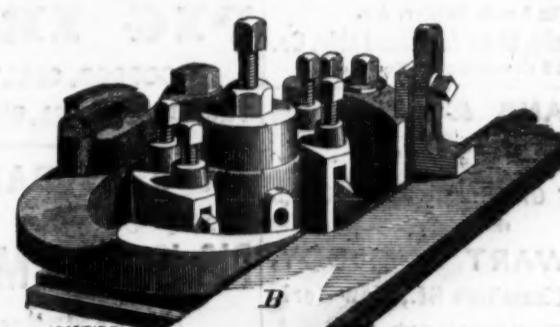
strain due to this cause. The bearings must be nicely adjusted, and the journals carefully lubricated. The shaft bearings in cases of such high speed, must be also provided for with great care and neatness. Furthermore, wood-working machines must be economically constructed. The reason for this is peculiar, and rests simply in the fact that the changes and improvements in this department of machinery are so rapid that few machines are retained in manufacturers for a long time. Richards, in his treatise on the construction of wood working machines, says "it can be safely asserted that there are throughout American factories but few wood machines that have been running ten

years." A machine must therefore be constructed rather with a view to economy than great durability.

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HINGED CHIP BREAKER APPLIED TO THE TONGUING MACHINE.

of the mills to their destination are equally as advantageous as are those for obtaining the raw material from which they are made.

The various processes of molding into pigs, puddling, squeezing, rolling into rails, etc., are all carried on here. Nearly 1000 men are employed night and day. One of the two blast furnaces has been fired up for three consecutive years. The other has been blown out once in that time. To feed these two furnaces has required during the past year 63,000 tons of iron ore. From this material the furnaces yield 27,247 tons of pig iron. The waste gas generated in the furnaces is conducted in pipes supplying the necessary heat for ten sixty foot

tal to the amount of \$750,000 in the business. The officers are Captain E. B. Ward, president; Hon. Alexander Mitchell, treasurer, and J. J. Hagerman, Esq., secretary. The latter gentleman has been general manager of the business of the company since its organization.

The first monthly report of the progress of the St. Gotthard Tunnel has just been published. At the end of December, nearly 400 feet had been pierced, and 43 feet of the masonry completed. About 60 feet of the cutting at the opening of the tunnel have also been finished. During the month of December an average of 272 men had been employed on the works.

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New Patents.

We take from the records of the patent office at Washington the following specifications of certain patents lately issued, which will be found interesting:

The following are abstracts of the specifications of patents 134,288 and 134,289, issued under date of December 24th, to Pierre Eymard, of St. Jean Baptiste, Canada.

IMPROVEMENT IN MANUFACTURE OF WROUGHT IRON.

The illustration is an end elevation, with parts in section, showing the arrangement of devices for conducting the melted metal from the cupola into the chamber.

The invention relates to an improved process of treating cast iron of all qualities for converting it into wrought iron; consisting in the addition of certain proportions of nitrate of soda, oxide of manganese and oxide of iron to a mass of melted cast iron, and in the employment of a blast of atmospheric air impinging on the surface of the liquid metal during the time it is being subjected to the intense chemical and mechanical action of the ingredients specified. The result is that the sulphur, phosphorus and arsenic are eliminated along with the carbon, leaving the iron in an approximately pure state, and forming a scum upon the surface of the melted iron, which, upon cooling, becomes scoria or slag. The function of the blast is mainly to separate or so act on this scum as to enable the sulphur to evaporate freely. The chemical admixture referred to consists of thirteen parts of nitrate of soda, seven parts of oxide of manganese, and four of oxide of iron.

In carrying out my invention, a furnace constructed in the usual manner is employed, except that a blast pipe, *a*, is connected with the cupola *b*, and is curved or bent downward within the same, as shown in the drawing, *c* is the door of the cupola, and *d* a trough for admitting the liquid metal into the same. *e* is a conductor or spout; *f*, a trough to receive the liquid metal from the conductor and admit it into the puddling furnace *g*. *h* is a door to draw the metal from the puddling furnace. The operation is as follows: Take three pounds of the mixture above described and place it in the cupola. Take also one hundred pounds of cast iron heated into a liquid state and let it flow through the trough *d* into the cupola. Allow the liquid cast iron to remain three or four minutes in contact with the mixture. Admit a blast through pipe *a* during the same time over or on to the surface of the liquid metal. The sulphur, the phosphorus, and the

arsenic which are contained in the cast iron are then driven away along with the carbon, leaving the iron in such a state of purity as to be equal in quality to the best Swedish wrought iron. A hole is then opened at the bottom of the cupola to allow the metal to flow through the conductor *e* into the trough *f* and from this last into the puddling furnace *g*, where the metal is puddled in the usual way. From the puddling furnace the metal is taken out through the door *h* and taken to the rollers, where it is converted into the shapes required by commerce.

Claim—1. The process of producing cast-iron from native ore by means of slag derived from treating melted cast-iron with oxide of manganese, nitrate of soda, and oxide of iron in the above specified proportions.

2. The process of producing cast-iron from native ore by means of the slag above described and the employment of a blast of air delivered through a pipe, *d*, curved or bent downward within the cupola, so as to convey an air-current upon the surface of the metal subsequent to liquefaction.

3. In combination with the cupola *a*, the pipes *d* and *f* and a suitably arranged cock for directing the air-blast, as set forth.

IMPROVEMENT IN CHARGING APPARATUS FOR IRON-HEATING FURNACES.

Specification forming part of Letters Patent No. 134,151, dated December 24, 1873, issued to William F. Maharg, of St. Louis, Missouri.

The accompanying illustration represents a side elevation of the apparatus, which is connected to or with a swinging crane, whereby a pile or charge of iron may be taken from the place where it is prepared and carried into and deposited upon the hearth of the furnace in such position as the operator may desire.

The crane, which is composed of the column or shaft *a*, horizontal arm or rail *c*, and tension rod or brace *b*, in any of the usual well-known ways, is supported in an upper and under arm or bracket, *i j*, so that it may swing or turn therein. These arms or brackets *i j* may be built in or attached to the corner of the furnace in the common well-known way. On the arm or rail *c* of the crane is mounted a carriage or truck, *d*, to the side straps or bars *e* of which is attached a hook, *k*, that sustains

The furnace used by these works is a Pilz blast furnace, 25 feet high and $3\frac{1}{2}$ feet in diameter, and has proved itself to be a most excellent one. It is 15 feet high from the tuyeres to the feed hole, $3\frac{1}{2}$ feet in diameter at the tuyeres, and 18 inches in thickness of walls. There are three tuyeres with $1\frac{1}{2}$ inch nozzles. The slag discharge is about 10 inches below the tuyeres. Blast is furnished from the student's blowers. They have been worked up to a pressure of one inch of mercury, but the usual pressure is one-half inch quicksilver height. Power is provided by a 25 horse-power engine, and the water required for many purposes is forced by a pump, from the River Des Peres, a considerable distance away.

The desilverizing of the pigs of combined lead and silver is effected in a cupel frame, where by certain operations the lead is oxidized or converted into litharge, leaving the silver deposited in what is called the test bottom as pure as it can be rendered, or 99.08 per cent.

This cupel is only used for the "rich" lead.

The poorest is put into kettles, mixed with zinc and desilverized—the gold and silver floating on the top when in a molten state,

and the baser metals being precipitated.

The precious metals are skimmed off and put into smaller kettles, the lead remaining.

The chemical agent in effecting the separation of the gold, silver and copper from the lead is zinc, which has a greater affinity for gold and copper than silver, and a greater affinity for the latter metal than lead. This quality of zinc led to the adoption of the plan of charging the tanks of boiling crude metal three times, the amount of each charge being graduated according to the percentage of pure metal to be taken up, by this means effecting a near approximation to a separation of the gold and copper from the silver at the first operation. The large iron vats are three in number, and one of them, in which the crude bullion is first melted, has a capacity of twenty-four tons. They are set in a massive structure of brick, raised so as to economize labor in handling the metal, and are heated by flues from furnaces underneath.

The drawing is a partly-sectional elevation of a furnace employed in carrying out the process. The slag is the residue of the burning of cast-iron with oxide of manganese, nitrate of soda, and oxide of iron in the proportions of ten parts of oxide of manganese, ten parts of nitrate of soda, six parts of oxide of iron. *a* is the body of a cupola. *b* is a door for introducing the slag and ore. *c* is the hinged cover for closing the cupola at the top. *d* is a pipe for admitting the air-blast in the upper part of the cupola. *f* is the ordinary blast-pipe entering the cupola at the base. The operation of converting iron ore into cast-iron is as fol-

lows: Place a charge of coal in the cupola *a*. Over the coal place a layer of slag. On top of this layer of slag place a charge of iron ore and cover it with a layer of slag. Then for every 100 pounds of iron ore which is in the cupola add 50 pounds of cast-iron. Thus the slag and ore are regularly stratified. As soon as the whole mass of metal which is in the cupola is brought to a red heat, close the cupola at the top by letting down the cover *c*. The carbon contained in slag will then go through the ore, and the whole of the metal immediately becomes fused. At the beginning of the operation the blast of atmospheric air is forced through the pipe *f* underneath the charge of coal in the cupola in order to ignite the coal. The air of the blast is subsequently directed, by means of a cock suitably placed, into the pipe *d*, so as to bring the current on top of the charge of metal in order to keep the gases

and its load, and deposits the latter in any suitable place in the furnace.

The operation is as follows: The iron for the charge is prepared on a table of about the height of the peal, or furnace door. The peal is then swung around by the crane to said table, or stand, and the flat end, *n*, of the peal is passed under the pile, or charge, so as to carry and sustain it, and the brace, *h*, arranged to steady the load. The operator guiding and controlling the peal, the latter with its charge is swung by the crane around to, and the end of the peal and the pile into, the furnace, the bend, or bow, of the bar, *f*, admitting of this operation. When the pile, or charge, is in position the operator, by means of the peal, drops, or deposits, it in the furnace.

Claim. In combination with a swinging crane, the carriage, *d*, bar, *f*, and peal, *g*, constructed, arranged and operating as and for the purpose described and represented.

Smelting and Refining Lead and Silver Ores near St. Louis.

The St. Louis Smelting and Refining Company, having completed their extensive works at Howard Station, about five miles from the city on the line of the Missouri Pacific Railway, are now engaged in treating large quantities of silver bearing lead ores from Utah and Colorado, which are brought from the ores to the works without transhipment. The usual product of the ores received here is about one-fourth of one per cent. of silver, forty per cent. of lead, twenty-three per cent. of silica, ten per cent. of moisture, eight per cent. of carbonic acid, and the residue iron, lime, zinc, etc. These proportions vary, depending upon the mines from whence the ores come, and upon other causes peculiar to the mining districts. Ore with the per cent. of silver mentioned above, and the class most frequently obtained by this company, produces about \$100 worth of silver to the ton, beside the lead. Taking the freightage and cost of ore from this, and the margin for smelting and refining is found.

After the constituents of the ore are specifically ascertained, it is carried up stairs convenient to the charging door of the furnace. Here it is first spread in alternate layers of flux and ore and coke, which is the fuel exclusively used for this reduction. The flux consists of slag and mill cinders, which renders the smelting more thorough and rapid. After being carefully mixed in the desired proportions, the charge is made in suitable time; each consisting of several hundred pounds of ore and other substances, is put into the furnace and subjected to the most intense heat. This operation is continually carried on, the blast being applied uninterruptedly, and the company are now smelting about twenty tons per day, making a draw of lead and silver in combination, of one to one and one-fourth tons every three or four hours. The slag is drawn off continually into iron pots, which are wheeled away in the shape of half eggs, to be rebroken and utilized over and over again in future charges, where it is used to great advantage in preventing the ore from lying too compactly in the furnace, and for other chemical purposes. The company are now building two additional furnaces—a smelting and a roasting furnace—about thirty ton capacity to each.

The furnace used by these works is a Pilz blast furnace, 25 feet high and $3\frac{1}{2}$ feet in diameter, and has proved itself to be a most excellent one. It is 15 feet high from the tuyeres to the feed hole, $3\frac{1}{2}$ feet in diameter at the tuyeres, and 18 inches in thickness of walls. There are three tuyeres with $1\frac{1}{2}$ inch nozzles. The slag discharge is about 10 inches below the tuyeres. Blast is furnished from the student's blowers. They have been worked up to a pressure of one inch of mercury, but the usual pressure is one-half inch quicksilver height. Power is provided by a 25 horse-power engine, and the water required for many purposes is forced by a pump, from the River Des Peres, a considerable distance away.

The desilverizing of the pigs of combined lead and silver is effected in a cupel frame, where by certain operations the lead is oxidized or converted into litharge, leaving the silver deposited in what is called the test bottom as pure as it can be rendered, or 99.08 per cent.

This cupel is only used for the "rich" lead.

The poorest is put into kettles, mixed with zinc and desilverized—the gold and silver floating on the top when in a molten state,

and the baser metals being precipitated.

The precious metals are skimmed off and put into smaller kettles, the lead remaining.

The chemical agent in effecting the separation of the gold, silver and copper from the lead is zinc, which has a greater affinity for gold and copper than silver, and a greater affinity for the latter metal than lead. This quality of zinc led to the adoption of the plan of charging the tanks of boiling crude metal three times, the amount of each charge being graduated according to the percentage of pure metal to be taken up, by this means effecting a near approximation to a separation of the gold and copper from the silver at the first operation. The large iron vats are three in number, and one of them, in which the crude bullion is first melted, has a capacity of twenty-four tons. They are set in a massive structure of brick, raised so as to economize labor in handling the metal, and are heated by flues from furnaces underneath.

The drawing is a partly-sectional elevation of a furnace employed in carrying out the process. The slag is the residue of the burning of cast-iron with oxide of manganese, nitrate of soda, and oxide of iron in the proportions of ten parts of oxide of manganese, ten parts of nitrate of soda, six parts of oxide of iron. *a* is the body of a cupola. *b* is a door for introducing the slag and ore. *c* is the hinged cover for closing the cupola at the top. *d* is a pipe for admitting the air-blast in the upper part of the cupola. *f* is the ordinary blast-pipe entering the cupola at the base. The operation of converting iron ore into cast-iron is as fol-

off and transferred to one of the three smaller vats immediately adjoining. A second similar operation, but with a large charge of zinc, takes from the lead all of the silver it contains, except a mere trace. The third charge seems to be intended principally to prove the thoroughness of the two first operations. At the conclusion of these processes the lead has attained a high degree of purity, but is subjected to another and higher refining. From the bottom of each vat an iron pipe leads to a reverberatory furnace, and through this the lead runs into the bath of the furnace, where it is subjected to a bright red heat for two and a half hours, by which time all of its base constituents are eliminated by oxidation, or, having formed a fused scum on the surface of the pure metal, are skimmed off. This is said to be the purest lead known to commerce, only carrying two pennyweights of silver to the ton, and being absolutely free from base alloy.

The company are reported as having made a business success from the outset, owing partly to good management and partly to the advantages of location chosen.

The Antiquity of Trade Unions.

Trade unions are not of such recent origin as many people suppose. "I am credibly informed," wrote Mandeville, the author of the *Fables of the Bees*, one hundred and fifty years ago, in his "Essay on Charity and Charity Schools," "that a parcel of footmen are arrived at that height of insolence as to have entered into a society together, and made laws by which they oblige themselves not to serve for less than such a sum, nor carry burdens, or any bundle or parcel above a certain weight, not exceeding two or three pounds, with other regulations directly opposite to the interest of those they serve, and altogether destructive to the use they were designed for. If any of them be turned away for strictly adhering to the orders of this honorable corporation, he is taken care of till another service is provided for him; but there is no money wanting at any time to commence and maintain a lawsuit against any master that shall pretend to strike or offer any other injury to his gentleman footman, contrary to the statutes of their society. If this be true, as I believe it is, and they are suffered to go on in consulting and providing for their own ease and convenience any further, we may expect quickly to see the French comedy, 'Le Malte le Valet,' acted in good earnest in most families; while, if not redressed in a little time, and these footmen increase their company to the number it is possible they may, as well as assemble when they please with impunity, it will be in their power to make a tragedy of it whenever they have a mind to."

New Iron Enterprise at Chattanooga, Tenn.—The *Chattanooga Times* says A petition has been, or will be soon, filed with the Chancery Court of this county, praying for the organization of a stock company, with a capital of \$500,000, to be known as the Chattanooga Foundry and Machine Works, Mining and Manufacturing Company. The corporators are Julian E. Raft, of Cleveland, the manager of the Ducktown Copper Mines, and Thos. Webster, S. M. Winchester, Gen. J. T. Wilder, H. S. Chamberlain, John L. Divine, E. G. Eaton and J. W. Webster, all of this city. The company when organized will purchase from Mr. Webster his extensive foundry and machine works, and manufacture all kinds of casting and machinery on a large scale. It is also proposed to erect a blast furnace in or near the city, in which they will make their own iron, securing the quality desired by a judicious mixture of ores, of which nearly every variety can be obtained within a radius of one hundred miles. It is also contemplated to build a narrow gauge railroad, about ten miles long, to Walden's ridge, for the purpose of bringing coal to this city for their own use and to supply the community. It seems to us that this company will be successful. In fact, with such men as are named as the corporators to manage its affairs, we do not see how it can fail of the most brilliant success. A blast furnace in or near this city, making good iron, will in itself be worth a fortune. Our iron men are now suffering from an iron famine with no immediate prospect of relief. The Shelby furnace, which supplies most of our best foundry iron, has been in blast two years continuously, and the boshes are so much worn that it will soon have to go out of blast for repairs. The new company will be organized as soon as they can secure their charter from the Chancery Court, and we hope they will commence the erection of their blast furnace and the construction of their narrow gauge coal railroad at once.

The Iron Ore Prospects.—The statement has frequently been made that the shipments of iron ore from the Lake Superior mines this year will reach enormous figures. According to estimates made last fall 800,000 tons were to be shipped from Escanaba alone, and adding the probable shipments from Marquette and L'Anse, and possibly from Ashland, the grand total of shipments from the Lake Superior mines this year were to reach nearly, if not quite, a million and a half of tons, against about 900,000 tons last year. However, the present prospects do not warrant any such conclusion. The iron markets are falling, and if the present tightness in the money market continues, the demand for iron must decrease, and the prices still further decline. Mr. S. S. Burt, of Marquette, who has been "outside" attending a convention of iron men, passed north on Saturday, and gives us the following figures as the prices demanded for ore delivered in Cleveland, by the mine owners: No. 1 specular, \$12; No. 2 specular, \$9; No. 1 magnetic, \$11.50; hematite, \$9. These prices are far in advance of those the iron manufacturers are willing to pay, and neither party show any inclination to change their views; so there is a consequent dead lock. Of the whole prospective

product there have been but about 300,000 tons entered upon as sold, and this not at any stated figure, but at "the market price." In order to get out anything like the amount of ore estimated last fall to be shipped this year, a heavy force in the mines would be required this winter; but, on the contrary, those mines being worked this winter are run very light, the owners not being willing to take the risks of the market. From this we infer that the estimated product for this year is too high, and that in reality it will not be very much in excess of last year.—*Green Bay Advocate*.

A New Weighing Machine.

The *Sheffield Independent* says: Until recently a ready means of ascertaining the correct weight of heavy goods has been one of the "good things to come." The difficulty hitherto experienced, however, has been entirely overcome by an invention known as "Duckham's patent," Mr. Duckham being an engineer at one of the London docks. The invention underwent a very severe test a few days since in weighing some of the armor plates at the Atlas Works, and the result was eminently satisfactory. The machine used on that occasion was one of 10 ton capacity, but they are made up to a capacity of 100 tons. It was so small that it occupied but one cubic foot of space, and so light that a strong lad could carry it and apply it for use. The machine is but an iron cylinder charged with oil, and fitted with a piston and a pressure gauge, the latter resembling the gauge commonly in use in connection with steam boilers. On its being attached to the crane block, some armor plates were raised by being connected with its piston rod, and the instant they left the ground their weight was accurately indicated on the dial. We understand the machine has been introduced into other large works in the neighborhood with considerable success; and judging from the favorable impression which the tests at the Atlas Works created, there can be no doubt it will soon be extensively adopted not only in iron works and collieries, but wherever goods are handled or dealt in by weight. The machine has been adopted by the English, Spanish, Russian and Brazilian governments; and so large has the demand become for it that a company with extensive plant and works has been formed to undertake the manufacture.

The Pipe Foundry Trade at Glasgow.

—This branch of business has, during recent years, been one of great magnitude in Glasgow, but there is reason to fear that the extravagant prices which are at present being quoted for Scotch pig iron may permanently injure it. Very few contracts of any importance are being closed with Glasgow iron founders. Tenders have recently been taken, through a Glasgow mercantile house, from several of the principal pipe founders for between two and three thousand tons cast iron water pipes for the city of Ottawa, and for between three and four thousand tons for the city of Toronto; but there is no confident expectation that orders will be received, in the mean time at all events, to proceed with the execution of the work, as the prices which are quoted are about 65 per cent. higher than was paid for an order of 3000 tons of similar goods executed in this city a twelve-month ago, through the same mercantile house, for the Water Commissioners of the city of St. John, New Brunswick.

The *London Times* states that a rotary puddling furnace, invented by Mr. Crampson, is shortly to be tried at the royal gun factories, Royal Arsenal, Woolwich. The peculiarities of this furnace are in the fact of the heating and puddling chambers being combined in one, unlike other rotary furnaces in which they are merely connected, and in the provision which is made for supplying the fuel in a pulverized state. There is in connection with the furnace a set of grinding gear and other apparatus complete, by which the fuel, which has simply to be thrown into a hopper, is carried by elevation to the stones, where it is pulverized into an almost impalpable powder, passed through a screen to insure uniformity in the size of the particles, and is then carried on to a blast pipe, and blown into the furnace in such quantities as may be required, the supply being regulated by a valve. The body of the furnace is formed of double plates, and between them there is a continuous flow of cold water, for the purpose of keeping the outside cool and protecting the inner lining, which has hitherto been the great difficulty with furnaces of this class.

Silvering Glass.—The process employed by R. Siemens, and described in the *Archiv der Pharmacie*, is as follows: Aldehyde ammonia is first made by conducting dry ammonia gas through aldehyde. The aldehyde ammonia and the nitrate of silver are dissolved separately in distilled water, and the solutions mixed and filtered. The proportions used are: 4 grammes nitrate of silver, and 2.5 grammes aldehyde ammonia, to one litre of water. The object to be silvered is first rinsed with a solution of sal Soda, then with alcohol, and lastly, with distilled water. When thoroughly clear, it is filled with the above solution and suspended in a water bath. The bath is heated gradually, and as soon as the temperature of 122° F. is reached, the silver mirror begins to form, which is completed at a temperature of about 130° to 140° F. At first the coating looks black, but as it grows thicker it acquires more lustre, and finally forms a beautiful silver surface. When this has taken place, the object is removed from the water bath. It can now be rinsed out with distilled water and allowed to dry.

A block of native copper, weighing nearly 105 pounds, was recently found in Leland town ship, Grand Traverse county, Michigan. As the locality is several miles distant from any known copper mines, the discovery excites considerable

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Curiosities of Coal.

BY JAMES A. WHITNEY, M. E.

Since Lord Dudley's experiments with pit coal in iron manufacture, the mining, preparation and use of this fuel has been the promoting cause of a heavy percentage of English inventions. Recently, some investigations, necessary from an expert's standpoint, brought to my notice a number of curious examples among the earlier alleged improvements, and some of these I purpose to embody in the present writing. I will speak here only of bituminous coal, but other forms, anthracite, lignite, etc., have secured equal attention, have provoked quite as many plans of alleged novelty and usefulness, and have cost to the full as much outlay as the other.

Going back to the, in the arts, remote date of 1824, we find that on February 28th of that year, one Thomas Harper patented one of the earlier methods of avoiding the celebrated smoke nuisance, which arose from the difficulty of wholly consuming the minute particles from bituminous coal, and which was finally "put down by act of parliament." He proposed, "for the general purposes of fuel," to mechanically mingle ordinary bituminous coal with stone coal, culm or anthracite, presumably to diminish the proportion of smoke evolved to the point at which the whole could be burned up by the flame, rendered brighter by the non-smoking material. The proportion of bituminous coal was, however, rather too small to render the method of much avail where the soft coal was plenty and cheap, and the stone or anthracite more costly, the percentage of bituminous being from one-twelfth to one-fifth of the whole. It was specifically set forth that "the stone coal may be either employed in the usual form or mixed with the small or culm thereof, about one-half of each, such proportions varying according to the draft or windage" of the furnace.

Fourteen years later, one Thomas Joyce conceived the happy idea of arranging a reservoir within a stove, in such a way that as fast as the fuel in the forepart burned away, a fresh supply came down from the reservoir. As English patents have been sometimes granted on inventions previously known, it is possible that that plan had an earlier inception, but so far as I know this was the first example of a type of cylinder stove now in almost universal use and favor in this country. The abridged specification of the patent, dated May 5, 1838, describes the improvement in this wise:

"Certain improved modes of applying prepared fuel to the purposes of generating steam and evaporating fluids. The fuel to be used in these furnaces may be coke or wood, coal, charcoal or other fuel prepared, chopped or broken into small pieces so as to insure its falling down the fuel chamber, as the lower part of the fuel is consumed. The combustion chamber consists of a vertical chamber with a grate and apertures, to support combustion at the bottom. It is filled with fuel which only burns at the lower part, the upper part falling down as the lower burns away, the flame and smoke pass out through side passages surrounded by water in the boilers."

The above affords an example of how a device hought of for one purpose may find its general use in another, for the steam boiler made as just specified is nowhere to be seen while the salient feature of the invention is nowadays embodied in the stoves that heat our parlors. A parallel case is found in the invention of Robert Walker, patented Dec., 1844, for riddling coals. This comprised a cylinder formed of longitudinal bars, with interspaces of suitable width. This cylinder being placed in an inclined position, and the broken coal being fed in at the upper end, the smallest pieces fell through the spaces, while the larger passed on to the lower end and fell out on a heap. This is the system of riddling now used abroad for assorting the broken stone from a Blake stone-breaker. Walker provided friction wheels, upon which rested the peripheries of the cylinder ends—a method of relieving the axial shaft that might in some cases be advantageously applied to the cylinders used in the treatment of paper stock with alkalies.

While on the subject of coal riddling, I may mention the project of Charles Cowper, whose patent bears date Nov. 2, 1849. An endless system of buckets lifted the coal and threw it upon an inclined series of perforated plates. The larger fragments passed on and finally off; but the finer falling through the holes in the plates, fell upon a rocking sifter, up through which water was intermittently forced to carry off the stones, the specific gravity of the latter being different from that of the coal.

The same patent—for an English patent may be made to include a pretty comprehensive subject matter—sets forth a mode of compacting the finer portions for use as fuel by means of tar. The culm and tar are to be placed in a pug mill and thoroughly mixed together. The mass during this operation was to be kept hot by hot air passed into the hollow axial shaft of the mill, and also into a jacket surrounding the latter.

It is difficult to speak of many departments of arts and industry without bringing in the name of Henry Bessemer before the article is completed. It is so in the present instance, and the prominent points of one of Bessemer's patents, granted in 1840, is worthy of mention with reference to the matter in hand. This comprised—I quote the abridged specification: "Heating small coal so as to soften the same, and pressing it into molds so as to solidify and press it into solid blocks, by letting it fall from a hopper with a regulating roller into a flue through which the heat from a furnace passes." The material was to be carried through the flue on a system of iron plates linked together to form an endless apron, and supported and operated by suitable drums or rollers. A piston finally forced the mass in portions through an orifice, and separated it into blocks of size suitable for

use as fuel. His description also explained the use of different kinds of coal in combination to form a fuel of any desired character; also the elimination of a portion of the volatile constituents of the coal before the treatment mentioned; also, the employment of steam to soften the material; also, the use of a partial vacuum in the elimination of any desired portion of the volatile matter by distillation. He also claimed avoiding the formation of smoke in furnaces by causing the coal to move with a regular motion from front to back of the fire-box. But the apparatus devised for the purpose appears to have been clumsy in the extreme, consisting of wheels lapping into each other in such manner as to present a closed surface for the support of the coal—a mechanism that would warp and twist out of all shape from the effects of the high heat in a very little while.

The Cooper Union Art School for Women.

The visitor to the art classes of the Cooper Union is impressed with three things—the enlightened liberality which prompted the venerable Mr. Peter Cooper to found and maintain the institution; the great and practical benefits which the lady pupils are deriving from the instruction they receive; and the interest they feel in their studies, of which proof is found in the rapidity with which they attain a high average of excellence in the several branches of art to which they devote their attention.

The school is divided into several departments, each of which is under the care of an experienced teacher, who not only understands fully the subjects taught, but seems to be impressed with the fact that the object of free instruction in an institution of this character is not so much to make artists as to prepare the pupil for the practice of some useful branch of art by which, if need be, they can support themselves comfortably wherever they may be.

In former years there was rather more of theory than of practice in the instruction given. This year a better system is followed, and the results attained are most creditable to both teachers and pupils. In some of the departments the pupils are earning good wages, being allowed to bring their own work, for which they have received orders, and receiving instruction in executing it. Every encouragement and assistance is given to those who wish to turn their knowledge to immediate account, and no young woman of courage, ability and talent need leave the school unprepared to earn a comfortable support in any city of the civilized world. The philanthropy which creates such an institution is worth more in a year than all the sentimental benevolence of a century.

THE ART SCHOOL is under the charge of Mrs. Carter, as principal, a lady of excellent talent, and possessing the rare ability of imparting to beginners correct ideas of the fundamental principles of art which are at first perceived, rather than understood. In the elementary class, instructed by Miss Powell, the pupils begin by drawing from plaster models—simple designs, from which they gain a knowledge of form, as expressed in lights and shades, rather than in outlines. No better practice can be had than this, and from a glance at the sketches and more or less finished drawings upon the easels of the pupils, many of which show high skill and true artistic feeling, the visitor perceives that the pupils are under good instruction, and that they are inspired to effort by the hope of success. The

ADVANCED CLASS IN DRAWING is under the charge of Prof. Venino, who instructs the pupils in more difficult studies—figure drawing and the like, in which casts of the finest classic statuary are taken as models. Much of the work done in this department is of superior excellence—better work, indeed, in some instances, than many artists of reputation could do. The particular excellence of the system of instruction followed in these departments consists in the fact that the pupils are never permitted to hide defects of drawing under the cover of careful and beautiful finish. The drawing must be correct, the expression of a face, or the position and character of a figure, must be caught and expressed in the picture, and one is surprised at the facility with which young women in the first or second year of the course will draw from such difficult models as the "Gladiator," "Hercules," "Proserpine," and "The Laocoon." From the drawing classes, pupils taking the full course are advanced to

THE CLASS IN PAINTING, under the charge of Professor Carl Hecker, an artist of talent, but especially adapted for the position he fills in this excellent school, because of his firm faith in the superiority of the practical over the ideal in the instruction of pupils who wish to turn the knowledge they gain to account. Prof. Hecker is too thoroughly a German, and too much imbued with German poetry and philosophy, not to love the ideal in art for its own sake; but his advice to his pupils is to learn something useful first—something they can find a market for anywhere, and upon which they can depend—and then study art in its higher forms if they choose. When we remember that many of our best artists, whose names are known throughout the country, depend for a living more upon drawing for newspaper and book publishers, than upon the sale of their paintings, it is evident that this advice is the best which could be given under the circumstances.

Connected with this department is a class in portrait painting, in which the studies are from life, having special reference to coloring and finishing photographs. Other pupils devote their attention to the retouching of negatives, and still others to photographing in its various branches, all of which Professor Hecker understands thoroughly and takes a great interest in teaching. Much of the work done in these departments is equal to that done in our best photograph galleries, and many of the

pupils in coloring are regularly engaged upon work for which they are well paid by photographers who keep them supplied with orders. Much of the success which attends the labors of Professor Hecker is due to the fact that the views of the other teachers are in perfect sympathy with his own regarding the proper method of instruction to be followed; and that, when the pupils come to him, they have a thorough knowledge of drawing and a correct understanding of the elementary principles of art. Under these circumstances instruction in painting is a task attended with few difficulties and, to a teacher who loves his art, a pleasure. Instruction is given in all branches of oil painting, and the pupils are making good progress. The

CLASS IN ENGRAVING

is under the charge of Miss Cogswell, a lady of taste and experience. The course of instruction comprises drawing and engraving on wood, and much of the work done by the pupils is ordered by publishers of books and illustrated newspapers. The work done by the pupils will compare favorably with the average work of journeymen engravers, and in designing many of them display excellent taste and judgment which promise to make them more than ordinarily successful in the practice of their profession.

At the present time there are about 200 pupils in regular attendance in the several classes. On Fridays visitors are admitted to all the departments, and if our wealthy and benevolent citizens would more generally avail themselves of this privilege there would, we think, be a more general disposition to follow the good example of Mr. Cooper in providing facilities for the education of young men and women who are willing to be taught some useful art or profession. The best kind of benevolence is that which enables those who need help to help themselves, and in no way can wealth be better employed than in fitting young men and young women—especially the latter—for the practice of some useful profession.

Overtaxation of Manufacturing Enterprises in Pennsylvania.

The following circular letter, presented at a recent meeting of manufacturers in Pittsburgh, will be sent to members of the Pennsylvania Legislature:

IRON ASSOCIATION ROOMS, PITTSBURGH, February 18, 1873.

DEAR SIR: As representatives of the industrial associations of Western Pennsylvania, in convention met, to take measures looking to a modification of the present tax laws of the State, we desire to make a personal appeal to you for your aid and influence in our behalf. Our object is to secure a repeal or modification of the present tax system, so as to relieve ourselves from the great burdens imposed by it.

You cannot be unaware that a movement of no little importance is on foot throughout the whole Commonwealth, looking toward the accomplishment of the end we seek. Such movement, we assure you, does not originate in any class or organization, but is the natural result of an evil which has made itself apparent to all corporations subject to these burdensome taxes. The tax laws are, in our judgment, rapping the wealth of the State; they are injurious to her best interests; they discourage labor; they drive away capital; they encourage dishonesty, and will lessen, we firmly believe, in the long run, the revenues of the State. They are unjust, unequal, and in contrast with the laws of other States, illiberal in a marked degree.

Is there any good reason why they should be continued?

The question is confidently asked, in the belief that none but a negative reply can be made. The messages of our governors, the press of the State, the theory of social scientists and, above all, our own experience, all suggest such reply; and we now urge upon you as custodians of the public interest and guardians of the Commonwealth, to exert your influence toward moulding into the organic law of the State a just and equitable provision for the protection of the interests of industrial corporations.

The people will sustain you in so doing. As your constituents we respectfully urge you to take in hand this subject, and, as your constituents, we do so with confidence in the belief that our interests are matters of thought and moment with you. We would respectfully suggest that some movement be inaugurated at this present session, which shall test the sense of the legislature as to the merits of our claim. Such movement will at least elicit the arguments for and against our claims, and if ever that be done we do not fear the result of an honest and conscientious action upon the question.

We shall watch your course on this matter with interest. Very respectfully yours.

The above letter was signed by the following gentlemen:

G. W. BACHELOR,
Eagle Cotton Company.
GEORGE C. MCMURTRY,
Standard Nut Factory.
JOHN SCOTT,
Mansfield Coal and Coke Company.

American Iron Bridges.—The method of making all the parts of a bridge to fit exactly, and securing the ties by pins, is peculiarly American. The plan still followed in Europe is that of using rivets, which makes the erection of a bridge take much more time, and cost, consequently, much more. A riveted lattice bridge one hundred and sixty feet in span would require ten or twelve days for its erection, while one of the Phoenixville bridges of this size has been erected in eight and a half hours, in consequence of this method of working. The American iron bridges are lighter than those of other nations, but their absolute strength is as great, since the weight which is saved is all dead weight, and not necessary to the solidity of the structure.

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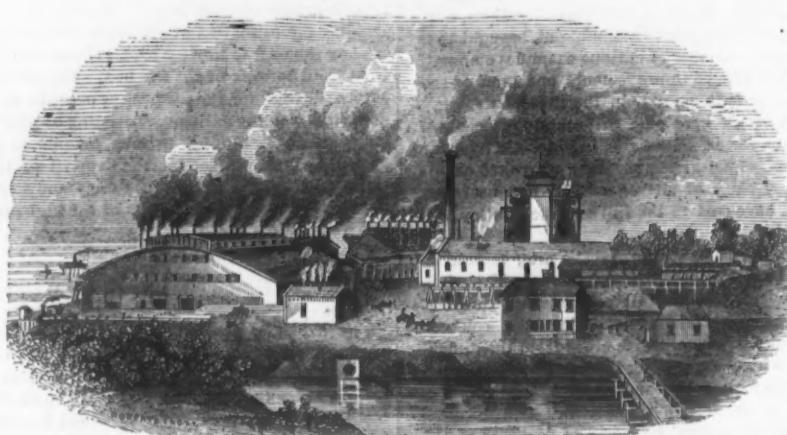
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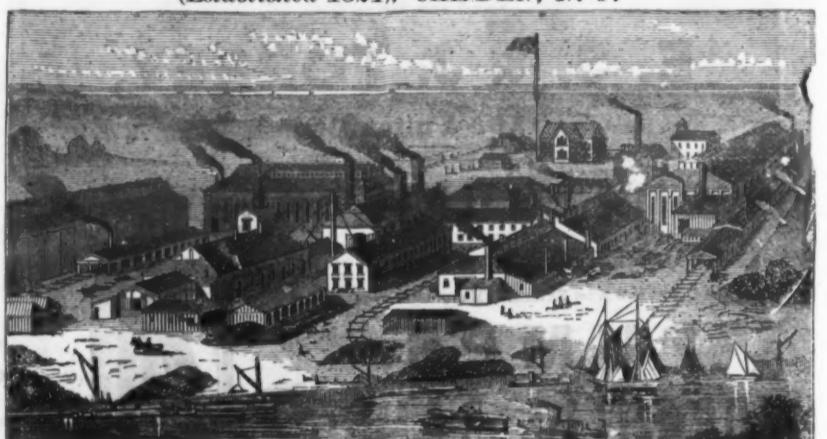
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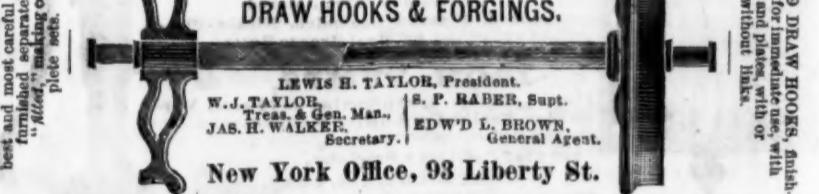
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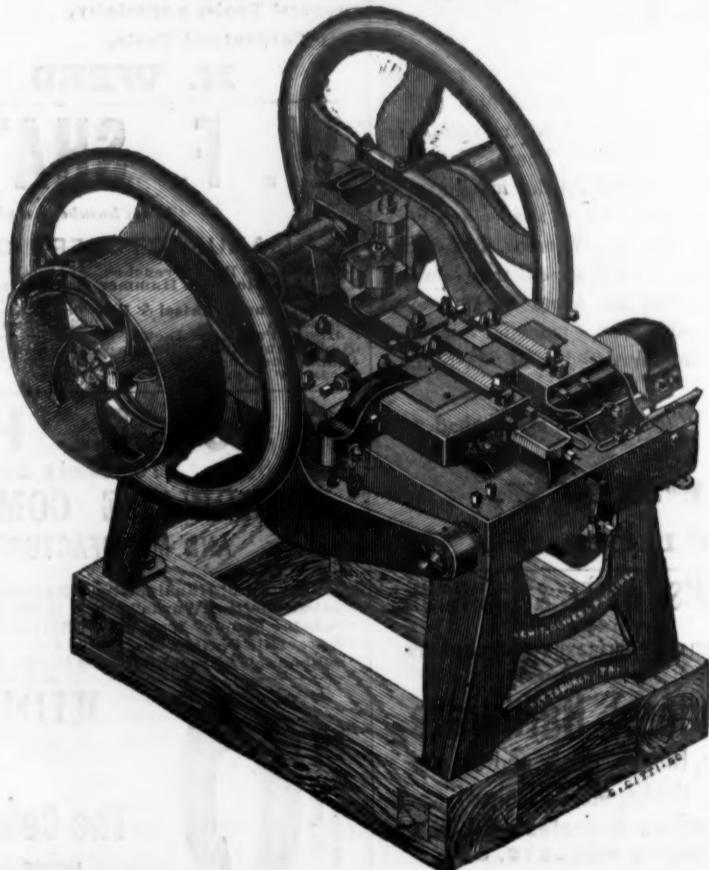
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Origin of the Silver-Plating Trade.

A person of the name of Thos. Bolsover was the discoverer of the art of plating with silver. He was by trade a cutter. In the year 1743, having some work in hand where the back of the knife was covered with silver soldered upon it, he found that he was short, and having no more silver in his possession, tried the experiment of putting the whole (as it was) through the rollers at the hazard. He found that both the hard and the soft lengthened together, and this caused him to reflect upon cause and effect. Thus was the art of silver-plating discovered, more by accident than from a knowledge of the nature of the substances employed. He then had a principle to work upon, and tried the experiment. Silver being sooner melted he found would be in a fluid state, and lay upon the surface of the copper, which took a more considerable degree of heat to put it in a state of fusion; so that when the silver was melted upon the copper it became one solid body, and was capable of being rolled down to any size or thickness.

The first use Mr. Bolsover made of his discovery was the making of plated buttons, which seemed to succeed very well. The discovery of plating being his own, he kept it secret, so that the exposure of the article did not for a length of time render him liable to any great opposition. The buttons he cut out with a fly under a bed and punch, and then hard soldered on the shank, and afterward polished or burnished. But the greatest difficulty he had to encounter was the want of money whereby to extend his trade. He had but little capital, and as far as he had gone was chiefly from the produce of his own hand labor. Mr. Pegge, of Beauchieff, who had some knowledge of Mr. Bolsover and his family, was the person he resolved to apply to for assistance. He waited upon Mr. Pegge, and was received courteously by him. He explained the nature of the case to him, showed him his patterns, and informed him of the prospects he had for the sale of his buttons. Mr. Pegge saw the feasibility of the speculation, and lent him the sum of £20, wishing him success. At the expiration of twelve months Mr. Bolsover waited upon Mr. Pegge again. Mr. Pegge said to him, "Well, Thomas, how are you? Are you come to borrow some more money?" "No, sir," was the reply; "I have come to pay you what money I have borrowed of you, with interest upon it." "Well, Thomas, I don't wish thee to injure thy trade to pay me; I don't want the money if it will do thee any good a little longer. Don't pay me if thou can't conveniently spare it." "Oh, yes, sir, I can spare it, and have plenty of money beside to carry on my business." "Why, Thomas, thy trade must be as good as making money." "Yes, sir, it is a good deal better than making money, for I can sell my buttons readily for a guinea a dozen, and the silver does not cost me more than 3/- a dozen, so it would cost me more to make money, than they do." He paid Mr. Pegge and thanked him. He was very successful in the button trade, and by chasing and ornamenting them he had a great variety of patterns. When he had been some years in business, he sent the sweepings of the shop to Mr. Reed's to be refined, and, in a little time afterward, he had sent to him £100 worth of silver. So much for the value of "shop sweepings."

In the year 1761, Joseph Hancock, a man of genius and enterprising spirit, and possessed of a small capital, was the first person who made any great practical improvement in the use of silver-plated metal. He it was who led the way from a button to candelabra, the plateau, the epergne, &c. Among the first articles manufactured by Mr. Hancock were plated spoons and vegetable forks, put together in two parts, and filled with soft solder: salt cellars, with blue glass to hold the salt. Candlesticks followed. The Corinthian pattern was a very neat one, care being taken to preserve as much as possible the Corinthian order in its construction.

It was some years after that the art of plating on both sides of the metal was found out, and this opened a wide field for the display of genius. Then followed the manufacturing of dishes, covers, tureens, bread baskets, butter boats, teapots, sugar basins, cream jugs, &c.; and when the art of drawing plated wire was got to perfection, fresh ideas sprang up, and the manufacture of castor frames, liquor frames, toast racks, snuffers, brushes, &c., was commenced. As trade increased in the plated line, it also increased in the silver line, and was the means of great improvement.

A great inconvenience was experienced in the silver trade, for they were obliged to send the manufactured articles to London, Coventry, York, or Birmingham to be assayed, there being no assay office at that time in Sheffield. The conveyance of the goods there and back was attended with considerable loss and expense. It was not until the year 1773 that the act of Parliament was passed for the Sheffield assay office, and then it was under great restrictions. Sheffield manufacturers are not allowed the same quantity of alloy for the Sheffield standard as they are in any other office in the kingdom, the Sheffield alloy being 3 or 5 dwts. of copper to 50 oz. of silver (fine), so that if by mistake or otherwise any article will not pass the Sheffield assay office, yet it will pass in any other office in the kingdom. In the year 1775 there were 3070 lbs. of manufactured goods assayed in Sheffield, a proof of the increase of the trade in silver, and the plated trade rose in proportion.

When Mr. Hancock had been in trade a little time it was soon discovered that a wide field for speculation was opened for the employment of capital. Several firms began business, and were formed of men of respectability, integrity, and perseverance, viz.: Messrs. Winter & Parsons, Messrs. Tudor & Leader, Messrs. Ashforth, Ellis & Co., Mr. Roberts, Messrs. Young,

Messrs. Morton, &c. These were what may be called the old school, but it was to these persons we owe the bringing of the trade from its infancy. There was a great competition among them as to who could produce the best article, not the cheapest.

Could the patterns be shown which were made at the time mentioned with what are produced now (50 or 60 years ago is meant), they would be a real curiosity. It is from the old and the more modern houses in Sheffield that the splendid shops in London, Edinburgh, and Dublin are set out with the notification "Real Sheffield Plate," in large gilt letters.

The late Mr. S. Roberts, of Park Grange, in an article furnished by him to the *Sheffield Mercury*, in 1843, thus speaks: "It is this year, I believe, just 100 years since the first attempt to plate was made by a manufacturer of knives of the name of Thomas Bolsover, who applied it to the making of the hafts of knives. I believe that he was joined by Mr. Wilson, who afterward began the trade at Sharow mill, and they together carried on the business at Highfield, but did not continue it long though they attempted the making of other articles of the same material. In the meantime, Mr. Joseph Hancock had taken up the business on a more extended scale. He succeeded in making many articles in what is called the brasserie line, such as tankards, cups, coffee pots, &c., to a considerable extent, and eventually established a mill worked by horse-power, for rolling the metal for such other manufacturers as had taken it up. The metal was at first rolled by hand, till Messrs. Tudor & Leader, and afterward Mr. Winter, applied horse-power. The making of silver and plated handles for knives and forks soon became extensive.

High Prices and the Future of British Iron.

A significant phase of the British iron trade is presented, with much force, in the following extract from the Glasgow *Herald*. Referring to the increase in the exports of Scotch pig iron during the past three years, and to the corresponding decrease in Scotch iron manufactures for the same period, it says:

"It is important to remark that under the head of 'consumption,' or domestic demand for pig iron, there is a diminution under the lessening production of our mines and the higher prices which have ensued during these three years; and that it is under the head of 'foreign export' that the real excess of demand appears. The domestic consumption fell from 506,000 tons in 1870 to 465,000 tons in 1871, and again to 460,000 tons in the present year, while the foreign export increased from 388,882 tons in 1870 to 512,479 in 1871, and again to 633,810 tons in the present year. This state of the case is very instructive. It shows how much more immediately any enhancement of the price of coal and iron cuts into the prosperity of our domestic manufacturers of iron, whether machines, engines, boilers and ordinary hardware, which employ a larger working population than our mining population, and in which our chief industrial excellence consists, than it does into the general foreign demand for the raw materials of this country, and how the latter demand may come materially to check, if not destroy, our general manufacturing prosperity. The foreigners do not like exorbitant prices for pig iron any more than we do ourselves; but they are not so susceptible to their influence as we are, and they follow the market with unabated appetite much longer than we can afford to do. There is a point of price at which the foreign demand would all but cease, and the exports of pig iron under the enormous development of value in summer and autumn have largely diminished during the last quarter of the year. But long before the foreign demand which has hitherto given, both in dull and prosperous times, much life and animation to our market, absolutely ceases, many branches of our own industry would be reduced to great extremity and collapse. This feature of the case is, in our opinion, very suggestive, though we do not think that the wisdom of the suggestion lies exactly in the direction of a prohibition of export, or even of an export duty on coal and iron, but rather, under the more broad and enlightened views of economic science which have obtained sway in this country, in a more practical and profitable application of British capital in foreign parts; that, instead of sinking millions annually in gold and silver mines, for which there is little or no social necessity in the present age, even if they were productive, which they never are, would be seen, with wise outlook, developing coal and iron, the prime agents of our own progress and civilization, wherever these were to be found and were in special request. An extension of the coal and iron-producing region of the world in this gradual way would not only relieve our own market from a pressure that may every year become a catastrophe to our manufacturing industry, but would give to our mining itself a more regular and more prosperous, while less gambling, form; and in developing the progress of other countries would redound to our own advantage in many obvious ways."

The above views meet a response in the Cleveland district. A circular letter from C. E. Muller, iron merchant, dated Middlesboro' Jan. 14th, says:

"With coke at 38/- per ton, and iron stone 7/-, the cost of pig iron is about 85/- per ton. It now remains to be seen to what extent dear iron will limit its use. Sooner or later we shall come to a severe contest with the competitors which are now being called into existence by our high prices for iron and coal."

Mr. J. Ch. Leye, in Westphalia, has recently laid before a meeting of experts in Vienna specimens of pipe not only for conducting water, but for gas, telegraph wires, brine and other metal-corroding liquids, speaking tubes, etc., all made of paper.

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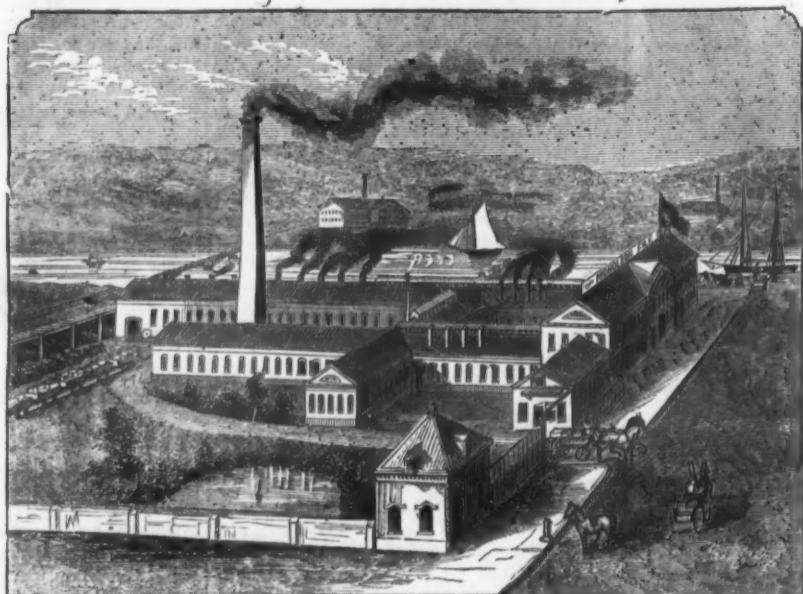
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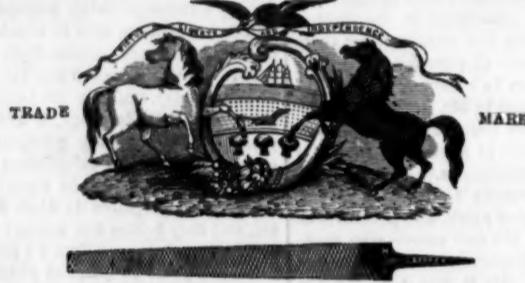
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All Nicholson Files are cut with the Patent Increment Cut, an invention owned and controlled exclusively by us, the file cut in this manner being Patented as a new article of manufacture, and differs from all other machine cut files (all of which have their teeth cut with equal spaces) by being cut with teeth slightly expanding or increasing in size and space from the point, thus avoiding the too great regularity of teeth common to all other machine cut files. The tendency of all cutting tools with teeth or cutters placed at regular distances from each other may be illustrated (to the machinist at least) by the fluted reamer—as it is well known that if a round reamer be made with (say 12) teeth whose spaces are equidistant, the hole reamed will not be round and smooth, but will approximate to a hexagon in shape. Whereas, if the same number of teeth be made of irregular distances, the hole reamed will be both round and smooth. The same is true of a file, hence the necessity of its having teeth at unequal distances, and to which we have applied the name of Increment Cut File, which possesses all the advantages of hand cut work, and the accuracy and uniformity of machine work. It is now upwards of six years since this File was introduced to the public, and the demand has increased until our production is undoubtedly treble that of any File manufactory in the country.

Our prices are as low as it is possible to furnish a really first-class File from the best of File Steel, and may be had, with full terms and conditions, by addressing the

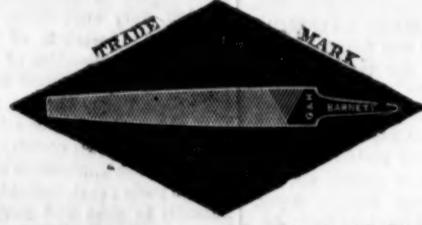
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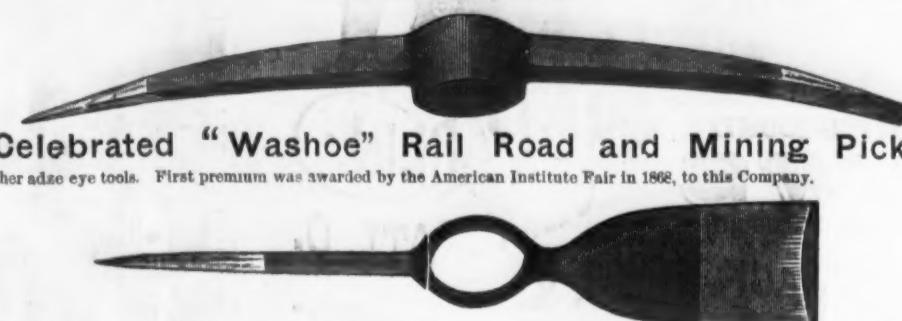
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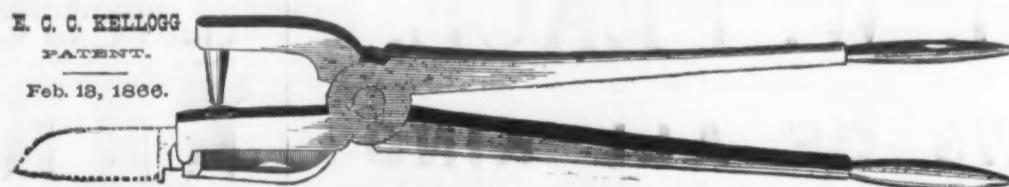
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Dear Sirs: The experience of a year proves that your *Furnaces Elevator* is superior to all others in use. We have in the six weeks from December 1st to Sunday last, 15th inst., made 9724 tons, 1492 lbs. Pig Metal, or an average of near 65 tons per day, which required the elevator to lift 72 feet high 4½ tons Ore, Coke and Lime stone for each ton of metal produced, or more than 11,500 tons material in the 6 weeks. The largest yield in one day was 81 1/4 tons Iron, involving the lifting of 342 tons material in 24 hours. This has all been done to our satisfaction, and that too, in the coldest weather we have had. Other furnaces with water and pneumatic hoists have experienced great difficulty, on account of the water freezing in the tanks; and in the case of the air hoists, we understand that two furnaces, not far from us, had to "blow out," from being unable to hold the stock during the "cold snap." The difficulty, we are told, was caused by the condensed moisture in the blast freezing to the sides of the cylinders, so that the piston could not move up or down. Very truly yours, DEWEY, VANCE & CO.

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THE IRON AGE.

BUSINESS ITEMS.

PENNSYLVANIA.

"The Allegheny Car and Transportation Company" is the title of a corporation which has been organized under a charter which authorizes them to build, equip, rent or contract for cars or other railroad vehicles, and to sell, use or rent the same to any person or corporation, or to transport freight. Thus the company possesses the franchises of a car manufacturing company, a rolling stock company, with privilege to rent its cars to railroad or transportation companies and individuals, and a transportation company or freight line. The capital stock is \$100,000, which may be increased to \$500,000. About \$80,000 has been already subscribed, and three acres of ground have been purchased in Wilkinsburg as a site for the car works. The erection of buildings will be commenced when the season opens, and the entire establishment completed at an early day. The men who are at the head of the enterprise are some of our most substantial citizens, and have the skill requisite to make the business remunerative.

The blast furnace at Martin's Ferry is doing exceedingly well. For several days recently it made 34 tons per day, which is considered a good yield for a furnace of its size.

The Cleveland Nut Company, Cleveland, are making hot pressed nuts with newly invented machinery, which has never been used in the West. The nuts, it is claimed, are superior to any other make, being entirely free from scale and perfectly smooth, making them easy to tap. In outward appearance they are very perfect. The concern are sole manufacturers of machine forged nuts in the West, and they possess facilities for making them in large quantities. They are running ten washer machines of a new design, having a capacity for five tons daily, making them perfectly flat and true. Messrs. Lamson, Sessions & Co., have the whole management of the works.

The blast furnace at Martin's Ferry is doing exceedingly well. For several days recently it made 34 tons per day, which is considered a good yield for a furnace of its size.

At Newburg, the American Sheet and Boiler Plate Company are putting in a sheet mill. They are also putting up the largest iron corrugating machine in the United States. The machine makes a 5½ inch corrugate from center to center, and works a sheet 9½ feet long. They are engaged in making the iron for the roof of the new passenger depot in Chicago.

MAINE.

At Camden, D. Knowlton & Co. are manufacturing passenger cars with the Miller platform. The Portland and Ogdensburg roads have made a contract with them for 25 of their improved box cars.

MASSACHUSETTS.

A new company was formed at Miller's Falls, February 6th, called Miller's Falls Company, with a capital of \$185,000. The new company's purpose is to consolidate the stock of the Backus Vise Company and Miller's Falls Company, and continue the business of both concerns under one management.

The Pennsylvania Iron Works, Danville, are putting in a new engine and pair of butt rolls in order to roll rail ends without reheating. Their furnaces No. 1 and 2 are turning out an excellent quality of foundry iron.

The Crane Iron Company, says the *Catasauqua Dispatch*, are constructing a new pattern of cylinder cars, which will be capable of hauling nearly twice the quantity those now in use do, and it is said they will be far superior to any in the Lehigh Valley.

MISSOURI.

The Vulcan Iron Works, at South St. Louis, resumed operations Feb. 10.

The Moselle Furnace, employs about 350 hands, and forms a village of some 30 buildings beside the buildings of the company. This furnace was established in 1843 by J. H. Brown & Co., of Ohio. The furnace has a capacity of 20 tons per day of pig iron, about one-half of foundry No. 1, one-fourth each of foundry No. 2 and mill iron No. 1. The company have ore land convenient, one mine near Beaver Switch, and one near St. James.

The Vulcan Iron Works, of St. Louis, have declared a dividend of 16% per cent. out of the earnings of the past six months. They have received 20 new coal cars from Litchfield, Ill., for their own use, and now bring their coal from Big Muddy by rail, and will during the entire year.

The new rail mill at Springfield continues in successful operation. The mill is supplied with coal, at 6 cents per bushel, from a shaft adjoining. A trestle and tramway extend from the shaft to the mill. The proprietor of the shaft pays the miners 4 cents per bushel for mining.

CALIFORNIA.

At the Occidental Foundry, San Francisco, the monuments to be used in making the boundary line between Nevada and Oregon are being cast. The monuments are quite plain, and bear the letters "Nevada, Oregon, Longitude, Degrees," and were designed by Colonel Von Schmidt.

The California Machine Works, in San Francisco, have just got under way. The firm intend manufacturing all descriptions of hoisting, pumping and mining machinery, quartz, saw and flour mills, and different kinds of iron and brass work. The majority of the tools for the shop were received from New Haven.

The manufacture of wire rope has been carried on in San Francisco for some time, but lately an establishment there has commenced the manufacture of submarine telegraph cables.

OHIO.

The firm of Webster, Camp & Lane, Akron, furnish mining, flour and saw-mill and pottery machinery. Their machine shop is two-storys; the foundry 50x65 feet; pattern shop two-storys high and 30x40 feet. They employ 40 men, and their yearly business amounts to \$90,000.

A Wheeling company is about to commence the erection of a large nail mill in Salem at a cost of \$100,000, employing 75 men.

The Trope Furnace Company, Jackson county, has been incorporated by Thomas Jones, John M. Jones, Daniel D. Morgan, and David P. Davis. Capital stock \$100,000.

At Dayton, the B. C. Taylor Manufacturing Company manufacture horse, hay and grain rakes, threshing machines, horse-powers, brick machines, &c. The business was established nine years ago by B. C. Taylor, and assumed its present firm title in 1870. The company occupy four buildings, covering one square. The main building is a two story, brick, 75x200 feet; another building is 60x125 feet; the warehouse is 60x150 feet; the foundry is 50x100 feet. The company employ 125 men; the capital stock of the company is \$125,000, and the annual business amounts to \$325,000.

The Akron Machine Works embrace five buildings, extending over a space 200x240 feet. One building is a three-story brick, 100x112 feet; the smith shop 36x36 feet, and a three-

story pattern shop 36x100 feet. This firm manufactures steam engines, mill machinery, iron and brass castings, potters' and sewer-pipe machinery, shafting and pulleys, and, among various patents of stoves, the King cooking stove. Their working force numbers eighty men; yearly business, about \$200,000.

The Cleveland Nut Company, Cleveland, are making hot pressed nuts with newly invented machinery, which has never been used in the West. The nuts, it is claimed, are superior to any other make, being entirely free from scale and perfectly smooth, making them easy to tap. In outward appearance they are very perfect. The concern are sole manufacturers of machine forged nuts in the West, and they possess facilities for making them in large quantities. They are running ten washer machines of a new design, having a capacity for five tons daily, making them perfectly flat and true. Messrs. Lamson, Sessions & Co., have the whole management of the works.

The blast furnace at Martin's Ferry is doing exceedingly well. For several days recently it made 34 tons per day, which is considered a good yield for a furnace of its size.

At Newburg, the American Sheet and Boiler Plate Company are putting in a sheet mill. They are also putting up the largest iron corrugating machine in the United States. The machine makes a 5½ inch corrugate from center to center, and works a sheet 9½ feet long. They are engaged in making the iron for the roof of the new passenger depot in Chicago.

MAINE.

At Camden, D. Knowlton & Co. are manufacturing passenger cars with the Miller platform. The Portland and Ogdensburg roads have made a contract with them for 25 of their improved box cars.

MASSACHUSETTS.

A new company was formed at Miller's Falls, February 6th, called Miller's Falls Company, with a capital of \$185,000. The new company's purpose is to consolidate the stock of the Backus Vise Company and Miller's Falls Company, and continue the business of both concerns under one management.

By a vote of the stockholders of the American Watch Company, Waltham, the capital stock of the company is to be increased from \$1,250,000 to \$1,500,000.

CONNECTICUT.

A new passenger engine, to weigh about 60,000 pounds, with a six-inch cylinder and twenty-two-inch stroke, is being built by the Hartford, Providence and Fishkill Railroad Company. The driving wheels are to be five feet in diameter. The company intend to put on their cars either the vacuum or Westinghouse air-brake.

At Bridgeport the labor question has broken out, and the proprietor of the malleable iron works, Elisha Hubbel, discharged twenty-five of his men for forming a union and annoying him, and supplying their places with men from Lowell. This so exasperated the discharged men that they attacked the others as they were going to their boarding house, inflicting injuries on one which is expected to prove fatal. Nine of the rioters have been arrested.

KENTUCKY.

Owensboro will have a stove foundry in operation in a week or two.

We learn that the Legislature of Kentucky has recently granted the Norton Iron Works, of Ashland, a special charter with liberal provisions and valuable franchises, and an increase of capital from \$700,000 to \$3,000,000, and that it is the intention of the Company to reorganize under it immediately. Heretofore they have had a charter under the general laws of the State. The new charter grants ample powers to enable the company to largely increase the extent and character of their enterprises in the development of their valuable mineral property, consisting of Star Furnace lands in Boyd Co., and Steam Furnace lands in Greenup county.

Under the able and energetic management of the president, Col. E. M. Norton, their furnace and nail works are being pushed rapidly forward toward completion notwithstanding the unfavorable winter for such works.

Three iron producing establishments in Boyd county have netted Kentucky more profit than the entire tobacco crop of the State.

Consumption of Timber in Railroad Ties.

—Estimating the railways of the United States as equal, including sidings, double tracks, &c., to 60,000 miles of single track, the aggregate number of ties would be 150,000,000, at the rate of 2500 to the mile. "This," says a recent circular of the lumbermen of Pennsylvania, "requires the timber from twelve and a half acres of well-timbered lands to furnish, because the average of trees from which railroad ties can be cut will not exceed forty to the acre, nor can there be cut more than five ties from each of these forty trees. The average life of a railroad tie is said to be about five years—consequently, 30,000,000 are requisite for repairs annually, and to furnish this amount will consume 2,500,000 acres of the best timber land. In addition to this vast area, about 500,000 acres are required annually to supply ties for the new roads which are being constructed each year." The circular referred to has been sent to lumber dealers and consumers through the State, calling attention to the condition of the lumber interests. It appears from this that the amount of pine lumber annually cut on the Susquehanna River and its tributaries exceeds 500,000,000 feet. Should this amount be cut for the next five years it would amount to 2,500,000,000 feet. A careful estimate has been made of the area of the timber lands, and the average yield of lumber per acre, and the alarming conclusion is reached that three years' stocking at the present rate of 500,000,000 feet per year would entirely exhaust all the pine lumber now standing. These statements are made after very careful estimates,

Keystone Saw, Tool, Steel & File W'ks,

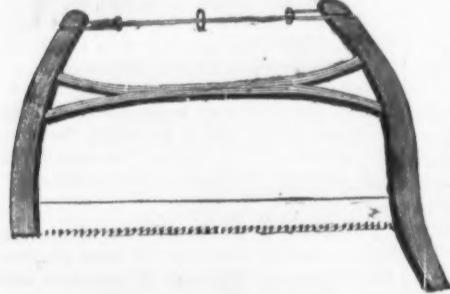
Front & Laurel Sts., PHILADELPHIA, PA.

HENRY DISSTON & SONS,

having rebuilt that portion of their extensive Works destroyed by the conflagration of Nov. 15, 1872, and having introduced new and improved Machinery for the Manufacture of every Article of the Trade, are prepared, with their increased facilities, to fill all orders with punctuality, promptness and dispatch.

Hankins' Elliptic Forked Saw Frame.

Patented June 28th, 1870.



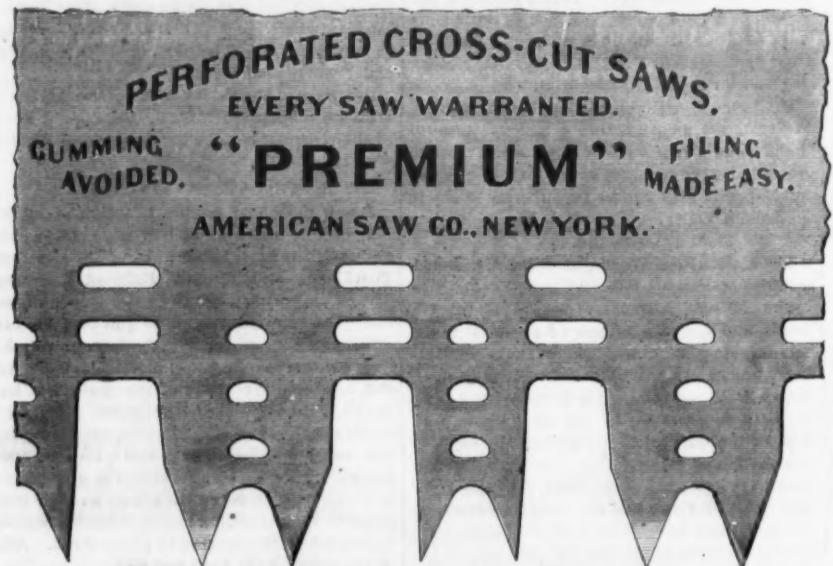
The annexed engraving represents HANKINS' ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any centre bolt, secures for the Frame great strength and durability.

These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

HARVEY W. PEACE,
VULCAN SAW WORKS,
WILLIAMSBURGH, N. Y.

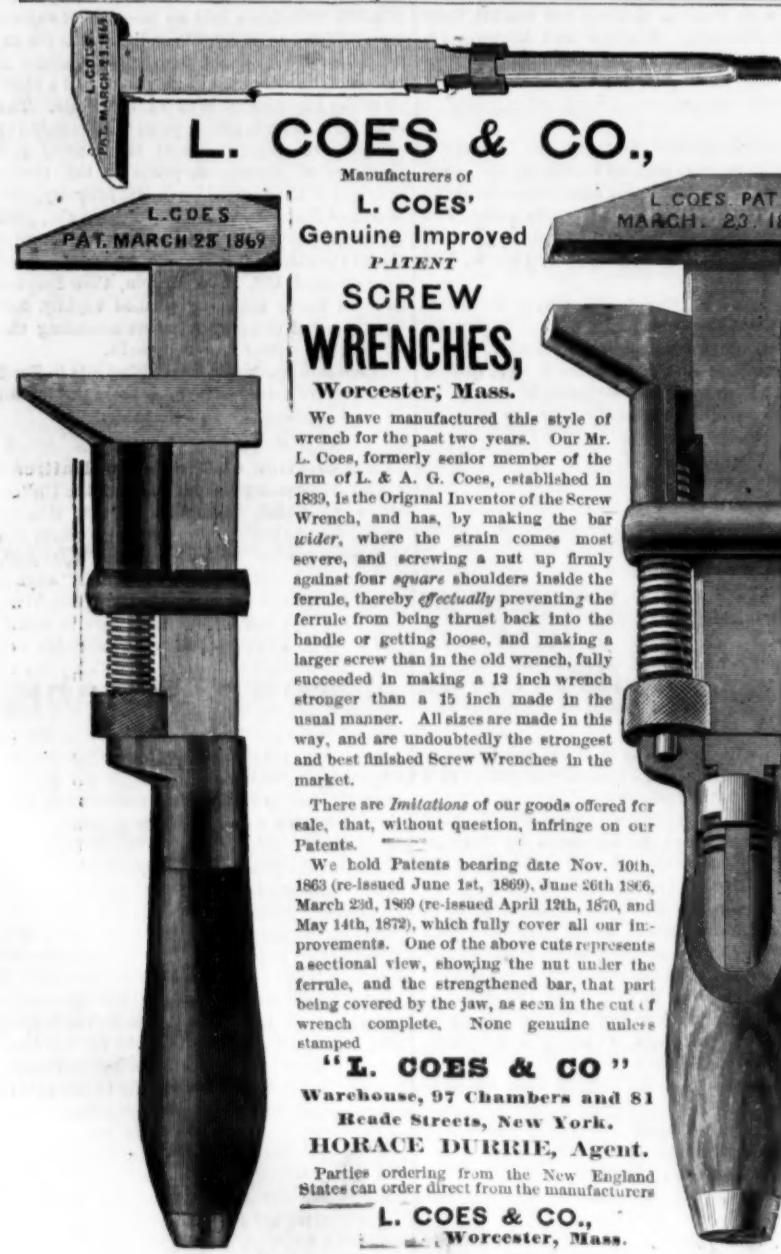
AMERICAN SAW CO.,

No. 1 FERRY STREET NEW YORK.



Solid saws require frequent gumming, thereby subjecting them to risk of springing or breaking. This is especially the case with cross cuts having Patent Teeth. In the perforated saws all gumming is avoided, and the teeth are easily kept long and in proper shape, saving time, labor, expense and vexation. As is well known, our saws cut faster, smoother and easier than any other.

MOVABLE-TOOTHED CIRCULAR SAWS AND SOLID SAWS OF ALL KINDS.



L. COES & CO.,

Manufacturers of

L. COES'

Genuine Improved

PATENT

SCREW

WRENCHES,

Worcester, Mass.

We have manufactured this style of wrench for the past two years. Our Mr. L. Coes, formerly senior member of the firm of L. & A. G. Coes, established in 1839, is the original inventor of the Screw Wrench, and has, by making the bar wider, where the strain comes most severe, and screwing a nut up firmly against four square shoulders inside the ferrule, thereby effectually preventing the ferrule from being thrust back into the handle or getting loose, and making a larger screw than in the old wrench, fully succeeded in making a 12 inch wrench stronger than a 15 inch made in the usual manner. All sizes are made in this way, and are undoubtedly the strongest and best finished Screw Wrenches in the market.

There are imitations of our goods offered for sale, that, without question, infringe on our Patents.

We hold Patents bearing date Nov. 10th, 1863 (re-issued June 1st, 1869), June 26th 1866, March 23d, 1869 (re-issued April 12th, 1870, and May 14th, 1872), which fully cover all our improvements. One of the above cuts represents a sectional view, showing the nut under the ferrule, and the strengthened bar, that part being covered by the jaw, as seen in the cut of wrench complete. None genuine unless stamped

"L. COES & CO"

Warehouse, 97 Chambers and 81
Broad Streets, New York.
HORACE DURRIE, Agent.

Parties ordering from the New England States can order direct from the manufacturers

L. COES & CO.,
Worcester, Mass.



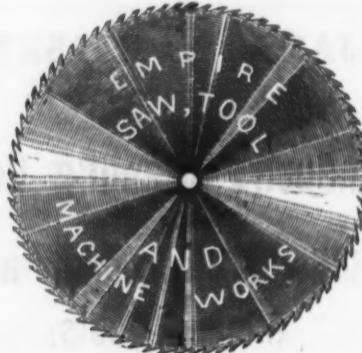
H. W. PEACE,

MANUFACTURER OF

SAWS OF ALL KINDS.

FACTORY, WILLIAMSBURGH, N. Y.

SAMUEL R. KENNEDY. JAMES ECCLES.
Samuel R. Kennedy & Co.,
2423, 2425, 2427 Lombard Street,
PHILADELPHIA, PA.



Manufacturers of Saws of all kinds,

Including Circular, Mill, Cross Cut, Hand, Panel, Rip, Back, Butcher and Compass, Turning, Felloe, Billet and Machine Webs. Also Shafting, Pulleys and Hangers, Lift and Force Pumps, Screw and Hydraulic Presses for Bookbinders and others. Saw Mandrels, Punches, Shears, &c.

Our Saws are Beveled by the most Improved Machinery known to the trade, and are fully warranted. Catalogues on application.



We make a specialty of the LARGEST SIZES of Circular Saws, and call particular attention of Importers and Manufacturers to the following points of excellence:

EVENNESS OF TEMPER.—The peculiar structure of our furnace subjects all parts of the saw to a DEAD heat, so when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—Our saws are ground on a patent machine, automatic in its operation, grinding the thick places upon the outer edge, and the thin places upon the inner, so that when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.

Properly Hammered.—Great care is taken that no part shall leave our works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, can not be successfully run—hence the importance of so hammering the saw as to effect a perfect balance of all parts, and at the same time RUN TRUE.

This department is under the personal supervision of our Senior, who has devoted over twenty years to the art of saw making.

We are proprietors and manufacturers of the celebrated "Clipper" Cross-Cut Saw. Price Lists of all kinds of saws sent on application.

JAMES OHLEN.

J. FLINT & CO.,
Manufacturers of all kinds of Saws and PLASTERING TROWELS.
ROCHESTER, N. Y.

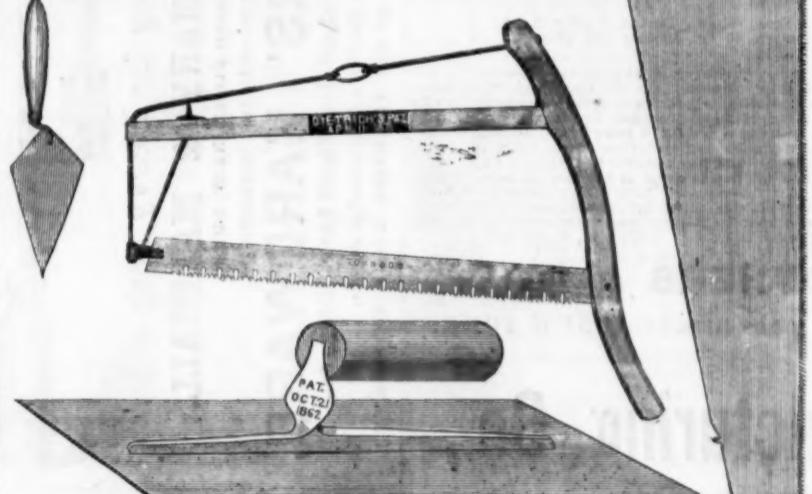
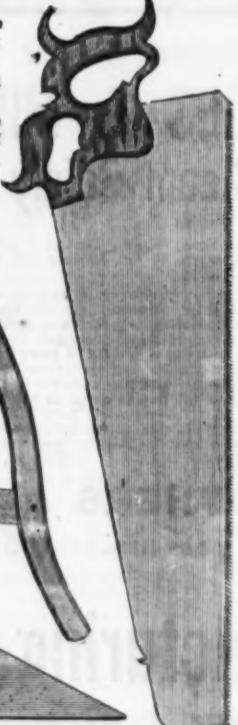
Dietrich's Patent Wood Saw. Guaranteed the strongest, lightest, easiest to strafe or tighten and best braced wood saw made; also to give perfect satisfaction.

Dietrich's Patent Double Handle Rip Saw. All will readily see the benefit of this useful invention.

J. Flint's Patent Plastering Trowels. The best made and finished trowel in the world. We make four grades of plastering trowels, from the best to the cheapest.

Our patent method of grinding hand saws makes them superior to any in the market.

Send for Illustrated Price List.



Chicago National Wire Cloth Mill,

36 TO 48 DILLER STREET.

EVANS & CO., Proprietors.

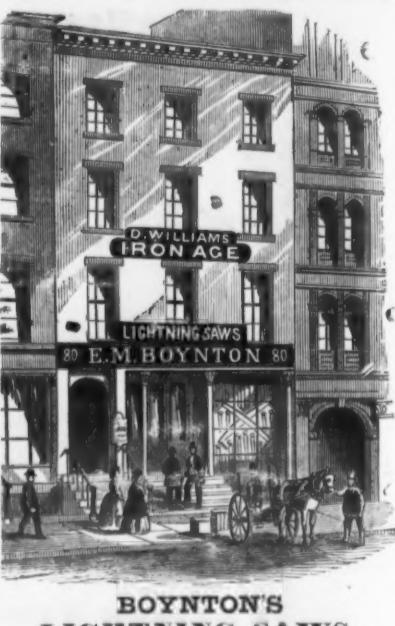
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CRIMPED LOCOMOTIVE SPARK CLOTH A SPECIALTY.

Price and Weight per Square Foot, by the Roll. For Steel Wire, add 7%.

3 x 3 MESH.	3 1/2 x 3 1/2 MESH.	4 x 4 MESH.	6 x 6 MESH.	8 x 8 MESH.	10 x 10 MESH.
No. of Wires per sq. foot.	No. of Wires per sq. foot.	No. of Wires per sq. foot.	No. of Wires per sq. foot.	No. of Wires per sq. foot.	No. of Wires per sq. foot.
10 3.47 40 11 3.20 38 12 2.80 35 14 2.43 33 16 2.00 30 18 1.39 30	11 2.75 32 12 2.45 31 13 2.15 30 15 1.97 30 17 1.47 25 19 1.08 25	12 2.10 26 13 1.85 25 14 1.62 25 16 1.51 25 18 1.11 20 20 0.76 20	13 1.61 22 14 1.41 20 15 1.31 21 17 1.10 20 19 0.85 18		

These Cloths are used for Mines, Jails, Asylums, and Storhouse Window and Door Guards, Mail Floors, Bulkheads and Floors for Grain Elevators and Grain Vessels. SPECIAL FIGURES FOR LARGE ORDERS.



BOYNTON'S LIGHTNING SAWS.

Awarded the Medal of the American Institute, 1872.



Two Direct Cutting Edges, instead of one Scraping Point. Note extra steel and durability over the old V, outlined on M tooth.

A Challenge of \$500, toward expense of a public test, to prove that the Lightning Saws excel all others in Speed, Ease, and Simplicity, has been offered since 1870, and has never been accepted. More than 100,000 Lightning Saws were sold during the year 1872, the purchasers of which testify to their American merits.

Our leading papers, such as the Tribune, American Agricultural, Christian Union, etc., have published over sixty editorial notices recommending these Saws. Mr. Glaser, of Philadelphia, and H. C. Deale, of Boston, unite in pronouncing the genuine Lightning Saw the greatest labor-saving implement of the age.

I have hundreds of letters from practical sawyers, uniformly written, expressing their entire approval of these Saws.

Where the Hardware Trade do not sell the Lightning Saw, I will send a 6-foot cross-cut and a buck saw-blade on receipt of \$6.

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Manufacturers of Warranted Cast Steel

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OF EVERY DESCRIPTION,

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Manufactured from

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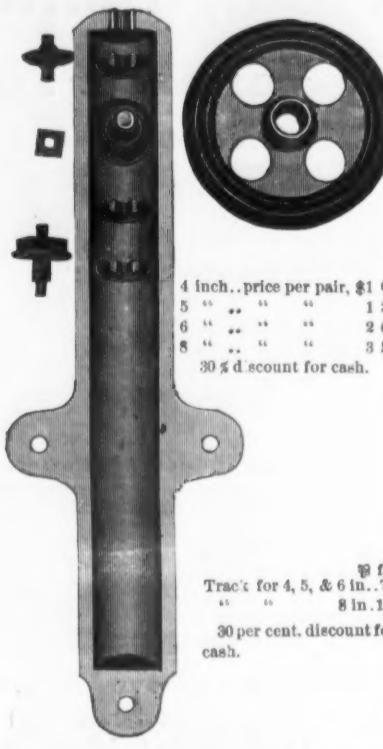
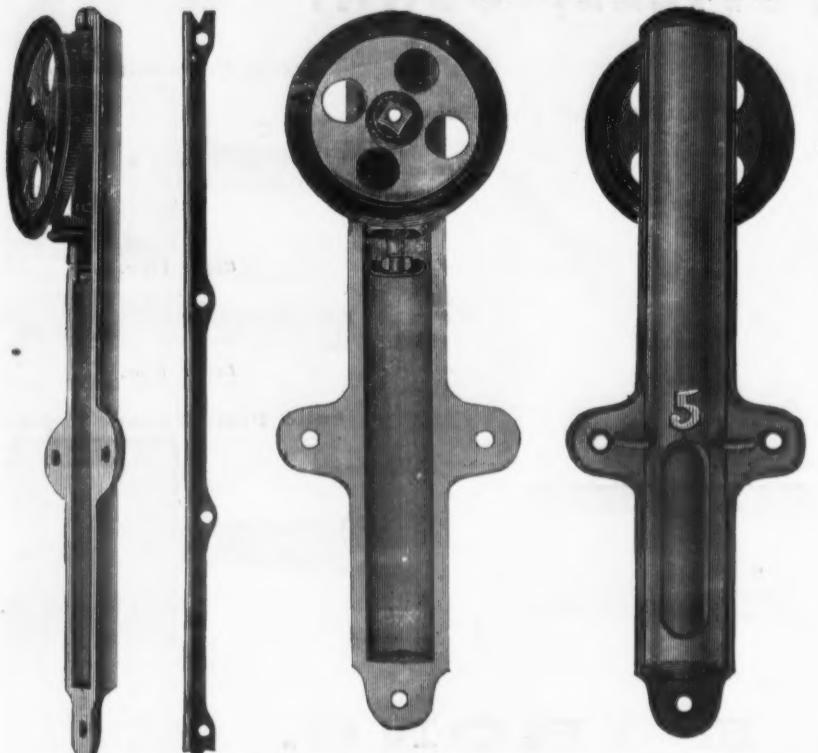
Capron's Improved Turbine WATER-WHEEL.

POLISHED & DETACHABLE BUCKETS CHEAPEST & BEST WHEELMADE.

CAPRON WATER WHEEL CO. HUDDSON

PATENT NOVELTY HANGER,

PATENTED JULY 23, 1872.



4 inch.. price per pair, \$1.00
5 " " " 1.30
6 " " " 2.00
8 " " " 3.50
30% discount for cash.

10 ft.
Track for 4, 5, & 6 in.. 7c
" " " 8 in. 15
30 per cent. discount for cash.

We, without hesitation, offer this Hanger as the best article in the market for the purpose. Its many advantages over all other Hangers are as follows:
1st.—It is more than double as strong as any other Hanger, owing to its semi-cylindrical or curved back.
2nd.—It is provided with a friction wheel at the top of the Case, which bears against the rear or outside of the sheaves, and prevents it from leaning outward and causing it to RUN TRUE, a feature not attained in any other Hanger.
3rd.—By thus causing the sheave to run true, the doors are always held up CLOSE TO THE FRAME, and maintain a close joint around it.
4th.—The sheave has but one flange, there being a lower friction wheel provided with a flange which extends under the face of the sheave and bears against the outer side of the track, which takes the place of the extra flange in the sheave, thus doing away with the grooved sheave which always grinds or breaks.
5th.—IT CAN NEVER RUN OFF THE TRACK.
6th.—It is the easiest running Hanger made, our 6 in. answering the same as 6 in. of the checkback and ordinary makes.
7th.—It is the Most Complete Hanger, in its construction, being tasteful, as well as durable.

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Washington Works, SHEFFIELD,
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Corporate Mark.

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We warrant our Knives equal in cutting qualities
and workmanship to any made. We also make
SILVER PLATED POCKET KNIVES,

which will not rust or become discolored when used as
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any other Knife.

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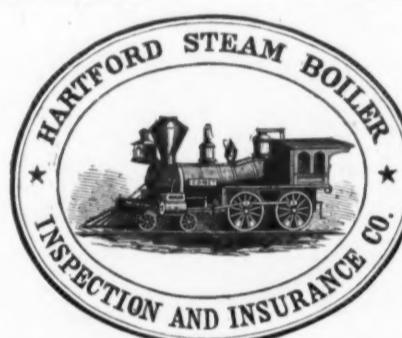
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as being the best REVERSIBLE LOCK made; equal in all respects to the old Style HANDED LOCK.

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COVERING ALL LOSS OR DAMAGE TO
Boilers, Buildings and Machinery,
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Catalogues sent on application.

Hart, Bliven & Mead Mfg. Co., General Agents for New York.

OSCAR V. GERZABEK,

Hardware Com. Merchant

AND

Manufacturers' Agent,

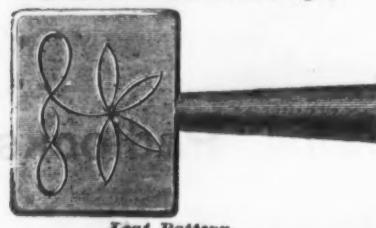
563 Market Street,

SAN FRANCISCO, CALIFORNIA.

Consignments solicited. Best References given.

H. D. SMITH & CO., PLANTSVILLE, CONN.

Patent Embossed Steps.



Leaf Pattern.

King Bolt Yokes.



Established 1850.

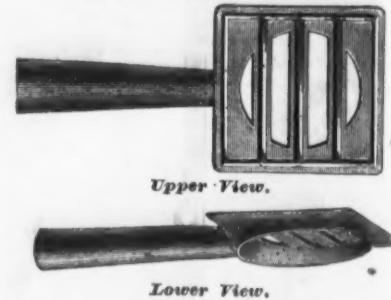
No. 6 Fifth Wheels.



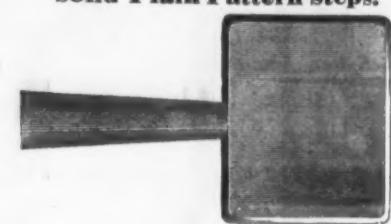
1871 Pattern Shaft Couplings.



Patent Cross Bar Steps.



Solid Plain Pattern Steps.



Smith's Improved Philadelphia Pattern Slat Irons.



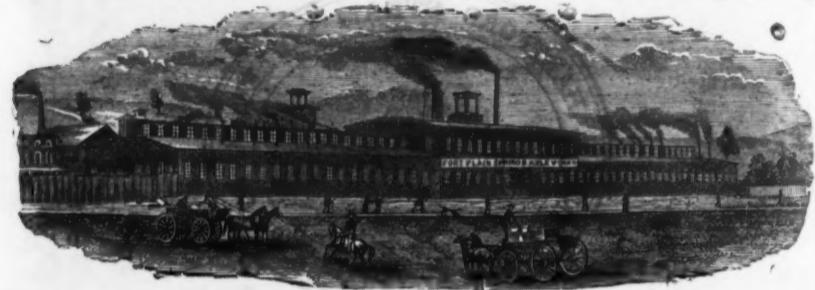
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FORGED CARRIAGE IRONS.

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Green Jacket Axles. FORT PLAIN, N. Y. Fine Carriage Springs.



MANUFACTURERS OF English and Swedes Steel Springs, and Iron and Steel Axles.

Execute orders promptly for

Black, Bright, Tempered and Oil Tempered Springs, Of any Pattern or Style. Also for AXLES of any description, from a COMMON LOOSE COLLAR to the FINEST OF STEEL.

Our facilities for manufacturing are very extensive, and with our recent additions of new and improved machinery, we defy competition.

Send for Price List and Descriptive Circular.

CARRIAGE BOLTS.

Buy the Best.



Best Bolt manufactured for all kinds of agricultural machinery. Will not split the wood, and can not turn in its place.

MANUFACTURED BY

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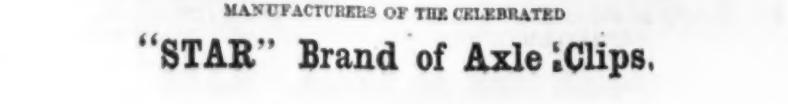
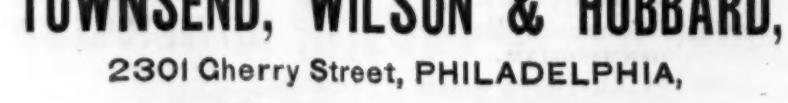
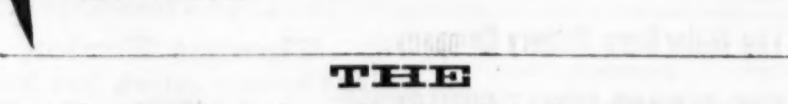
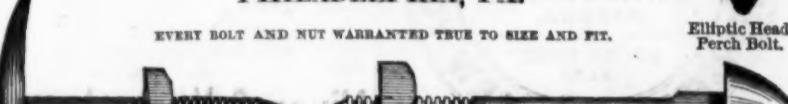
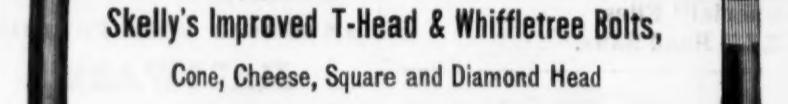
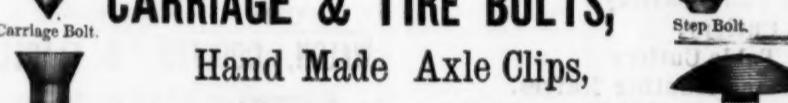
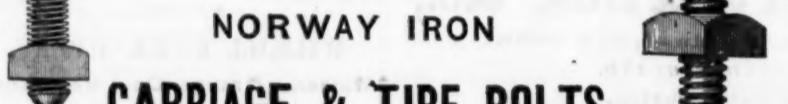


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	Whitehill, Smith & Co., Newburgh, N. Y.
	Wright J. W., 113 Spruce, Phila.
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	Dickinson Henry, 66 and 68 Reade, N. Y.
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	Moss F. W., 80 John, N. Y.
	Sanderson Bros. & Co., 16 Cliff, N. Y.
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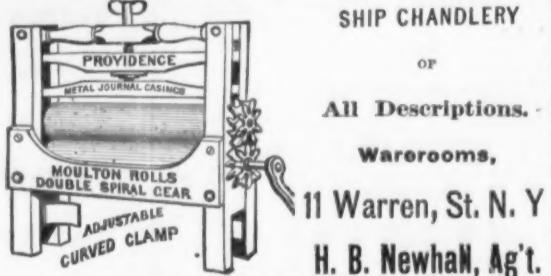
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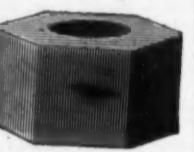
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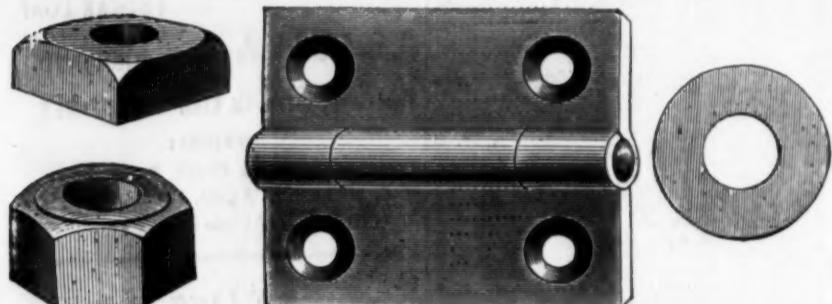
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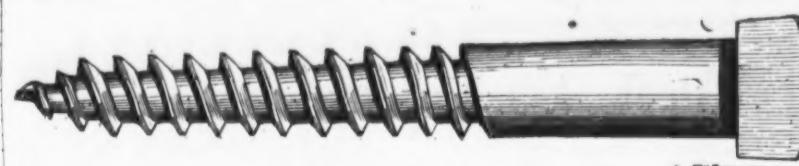
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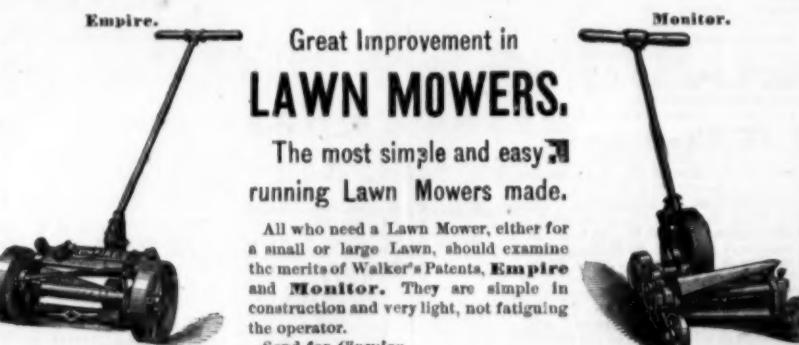
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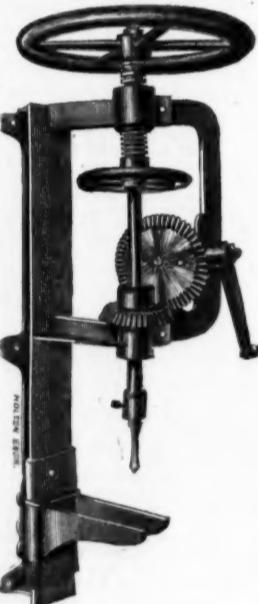


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Falls. Sleeping Coaches to destination.

11:00 A. M. Express Mail for Buffalo and Niagara
Falls. Drawing Room Coach to Susquehanna
and Sleeping Coaches to destination.

5:30 P. M. Night Express. Sleeping Coaches to
Buffalo and Niagara Falls.

7:00 P. M. (Daily) Cincinnati and Chicago Night
Express. Sleeping Coaches through to Cincin-
nati, Buffalo, Niagara Falls, and thence to
Chicago.

Additional Trains leave for
Niagara Falls, 5:30, 7:45 and 11:30 A. M., and 3:15, 5:15
and 6:30 P. M.

For Port Jervis, 8:00, 9:00, 11:00 and *11:15 A. M.,
4:30, 5:30, 6:30 and *7:00 P. M.

For Goshen and Middletown, *7:30, 8:00, 10:30, 11:00
and *11:15 A. M., 3:30, 4:30, 5:30, 6:30 and *7:00 P. M.

For Warwick, 8:00, 11:00 and *11:15 A. M., 4:30 P. M.

For Newburgh, 8:00, *8:30, 9:00 and 11:00 A. M., 3:30,
4:30 and 5:30 P. M.

For Poughkeepsie, 8:00, 10:30, 11:00 and *11:15 A. M.,
3:30, 5:30, 6:30 and *7:00 P. M.

For Ridgewood, Hoboken, Allendale, and Ramsey's,
*7:30, 8:00, 10:30, 11:00, *11:15 A. M., 3:30, 5:00, 6:00,
*6:30, 7:00 and *11:30 P. M.

For Paterson, 6:45, *7:30, 8:00, 10:30, 11:00,
*11:15 A. M., 12:00 M., *1:45, 3:30, 4:00, 5:00, 5:15, 5:30,
6:00, *6:30, *7:00, 8:00, 10:00 and *11:30 P. M.

For Rutherford Park and Passaic, 6:45, *7:30, 8:00,
10:00, 11:00 A. M., 12:00 M., *1:45, 3:30, 4:00, 5:15, 6:00,
*6:30, 8:00, 10:00 and *11:30 P. M.

For Newark and Elizabeth, 6:45, *7:30, 8:00, 10:00 and
*11:30 P. M.

For Newark and Wayne, 5:00, 5:15 and *5:45 P. M.,
A. M., 1:00, 4:00, 5:00, 6:00 and 6:30 P. M., and Satur-
days only, 12:00 midnight.

For Hillsdale and Way, 5:00, 5:15 and *5:45 A. M.,
1:00, 4:00, 5:00 and 6:00 P. M., and Saturdays only,
12:00 midnight.

For Creskill, 5:00, 7:45, *9:00 A. M., 1:30, 3:15,
4:15, 5:30, 6:30 and *7:45 P. M. Saturdays only, 12:00
midnight.

For Upper Piermont, 5:00, 7:45, *9:00 A. M., 1:30,
3:15, 4:15, 5:30, 6:30 and *7:45 P. M. Saturdays only,
12:00 midnight.

For Piermont and Nyack, 7:45 and *9:00 A. M., 1:30,
4:45, 5:30, 6:30 and *7:45 P. M. Saturdays only
12:00 midnight.

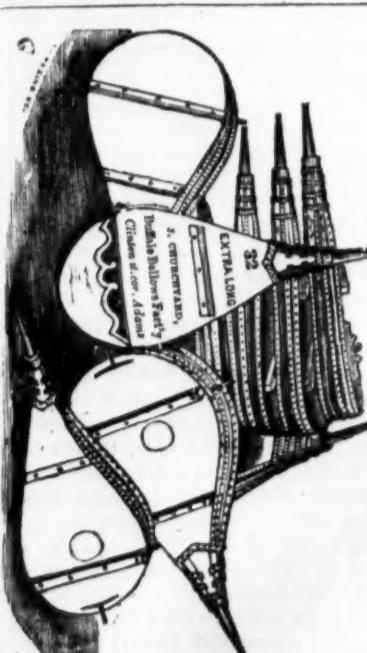
N. R.—Trains leaving Chambers street on even
hours or half hours leave 23d street fifteen minutes
earlier than above time. The 5:00 A. M., 10:00 and
11:30 P. M. Trains start from Chambers Street only.

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The Antwerp Metal Market.
(Translated for The Iron Age from the "Revue
Commerciale et Maritime.")

ANTWERP, Feb. 14, 1873.—**Metals.**—The market
is quiet and without anything doing for the
want of stock. We have imported during the
week 2663 tons of Pig Iron and 2368 ingots
Copper from England.

The Hamburg Metal Market.
(Translated for The Iron Age from the "Borsen-
halle.")

HAMBURG, Feb. 14, 1873.—**Lead.**—The market
is firmly sustained at the recent improvement, but
the dealings are light. German is quotable 23
to 24; English, 24, and Spanish (of Rein & Co.),
24½ marks. Copper has been little inquired for, but is nevertheless unaltered. Northern
sorts, 97 to 105 marks. Tin in quiet; Banca,
16½; English, 15½; rod, 160 marks per pound.
Spelter has been in improved demand, and
"spot" has been paid higher. Sales of the
week 8500 cwt. on the spot and to arrive, at
24½ to 25 marks.

Latest Dutch and India Tin Telegrams.
(Private Dispatches Communicated to The Iron
Age.)

AMSTERDAM, March 1, 1873.—Tin has a down-
ward tendency.

SINGAPORE, Feb. 11, 1873.—Tin—\$36 per picul.
Exchange, 4½%.

PENANG, Feb. 11, 1873.—Tin—\$34 60 per picul.
Exchange, 4½%.

Aitken, Spence & Co.'s Ceylon Plumbago
Report,

(Condensed for The Iron Age.)

COLONBO, Jan. 23, 1873.—**Plumbago.**—As sur-
mised in our last, the supply of this article is on
the increase, but not sufficiently so to have any
effect on prices, which remain unaltered and
steady. Some few contracts, amounting to
about 300 to 400 tons, have been made for
American account at present rates, deliverable
within the next three months. Prime qualities
continue scarce, while inferior ones are in sup-
ply, and owing to there being little demand,
the stocks increase. Since we last wrote, two
other small vessels have been taken up to load
for New York direct, and are at present well on
with their loading. We calculate they will take
about 300 tons of this article. Our Gallo friends
advise us of a contract having been entered into
there for about 350 tons, deliverable in
three months, of fair quality, and intended
for the American market. The weather
there has been favorable for mining operations
in their districts. We quote Lump, cleaned,
with packages, per ton, first cost \$30; free on
board with freight and exchange without com-
mission, 616 10 per 20 cwt., freight 80/- Chip,
328 4, free on board. Dust, 228 10.
Freights.—We have to advise the fixture early
in the fortnight of the John Kendall, 242 tons,
and the Queen of the Fall, 133 tons, to load for
New York, and the Rapido, 229 tons, for Phila-
delphia direct. These are all well on in their
loading, and will, probably, be January sailing.
The latter takes a quantity of Plumbago, with
Copper and measurement. There is nothing
loading at Gallo, but the Francis, referred to in
our last, has arrived, and on discharge will load
at both ports for New York. No cargo, so far
as we can learn, has been booked for her at
Gallo. Freights are steady at 80/- for Plumbago.
Exchange, 2½ to 1 per cent. American for credits,
and par for documents, at 6 months' sight.

New Fire-alarm Box.—It is proposed to
introduce in Cincinnati a new fire-alarm box,
which is thus described by the *Commercial*: The
apparatus is run by a clock-work, automatically
set in operation by the descent of an iron weight,
which is forced to the top of the box by pulling
down the hook. The machinery once set to
work, the hook can be worked up and down
until the weight completely descends, without
interfering with the clock-work.

The main shaft bears an insulated circuit wheel
of hard rubber, on the cylindrical surface of
which there are inserted a number of metallic
tongues corresponding to the number of the box.
This circuit wheel rotates, and two fixed spring
arms or circuit fingers of German silver press
against and slide on it. These are split so as to
constitute double frictional contact, which is
for wear and tear is essential. The rotation of the
wheel successively bringing the metallic tongues
and rubber interstices against the ends of the
circuit fingers, breaks and closes the circuit
made by the two sets of fingers and the main
circuit wires, so that the signal bell at the central
office, by a due number of strokes, announces
the number of the alarm box. The speci-
men box presented is fitted so that the work
stops when the circuit wheel has made four rev-
olutions, corresponding with a like number of
registrations.

When the lifter is raised a connection is also
established with an electro-magnet, which neutralizes
the action of any other boxes for the
same district for the present alarm—a late im-
provement of great importance under some cir-
cumstances, because more than one box can be
pulled in a district, according to requirements,
without creating confusion. The whole mech-
anism is most carefully inclosed in a cylindrical
extra box of iron, the cover of which is tightly
fitted and screwed up. This inner case is fixed
within another iron box containing the light-
ning arrester, key and recording bell, all under
lock and key, and accessible only to the office in
charge. This outer box is fixed within the com-
mon alarm box, and when the latter is unlocked
by any of the persons intrusted with signaling
alarms, nothing is exposed but the brass hook, a
pull at which ends the business.

</div

The Iron Age.

New York, Thursday, March 6, 1873.

DAVID WILLIAMS . . . Publisher and Proprietor.
JAMES C. BAYLES . . . Editor.
JOHN S. KING . . . Business Manager.

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Another General Strike Threatened.

It is currently reported, and generally believed, that the general resumption of business in the spring will witness another general strike, like that ordered by the trade unions last fall on the pretext of a reduction in the hours of labor. What will be demanded this time is not fully known; indeed, it is doubtful if the unions have yet determined what they want. It is understood, however, that different trades will make various demands; some for shorter hours without reduction in wages, some for increased wages without change of hours, and some for other concessions peculiar to the trades making the demands. It is also understood that upward of seventy distinct trades have declared their intention to declare strikes when the movement is started, including the iron founders, and moulder, machinists, pattern makers, blacksmiths, engineers, gas and steam fitters and plumbers, tin and sheet iron workers, and other trades connected more or less intimately with our metal working industries. If the reported intention of the unions is fully carried out, there will be a general suspension of manufacturing in and about New York, until labor or capital shall capitulate and abandon the contest.

This information we give for what it is worth. Many of our principal manufacturers have been apprehensive that the differences temporarily adjusted last fall by a return of the strikers to work, would be renewed this spring, and the unions make but little attempt to conceal the fact that a general strike is proposed, in which all organized trades are to take part. It makes but little difference whether labor has any just cause of complaint or not. When a strike is agreed upon, the leaders of such a movement have but little difficulty in fixing upon a pretext, which the specious demagogues who harrangue the unions can easily magnify into a grievous wrong or a most desirable advantage, as the case may be.

The working classes are easily led, easily deceived with false hopes and expectations, and easily made to believe that capital can be coerced into granting any concessions which labor may choose to demand. The unions promise them support, and only too large a proportion of our workingmen will hail any pretext for idleness as a blessing, provided the unions will guarantee to return them a portion of the money they have already paid into their treasuries. There is nothing improbable, therefore, in the intelligence that the men who control the unions are about to precipitate another general conflict between labor and capital for their own ends, or that the workmen who compose the unions, and are willing slaves to their orders,

and regulations, are prepared to strike when the signal is given. The question of interest at the present time is, therefore, how is capital prepared to meet the threatened emergency and to defend itself and its rights? Employers wonder that the workingmen have not learned the folly of strikes from their costly experiences in the past; have they learned from experience that union and co-operation are the only weapons with which it is possible to combat successfully organized labor acting under orders emanating from some source which the workingmen regard as authoritative? We had hoped that the lessons of the great eight hours strike of last fall would not be forgotten, and that employers in all trades would learn from their experiences during that trying season the necessity for the most intimate co-operation and the utmost possible harmony of action when resistance to the demands of the trade unions became a necessity. Possibly our hope was not unfounded, and it is gratifying to note that in several trades employers are already organizing associations, and that the strike, should it come, will not find them wholly unprepared to resist it. That any such organization is necessary is certainly to be regretted, for the labor market would be in a far better condition, and the interests of both masters and men more secure, if to the natural laws of trade were left the regulation of both wages and profits. But while organization and co-operation exist among the workingmen, employers who are dependent upon the labor of union men must have recourse to the same expedients. Prompt and decisive action in this respect among employers would have a most wholesome moral effect at the present time, and would do much to avert the danger which now threatens our industries.

An Important Metallurgical Movement in Germany.

The following appears in the last issue of *The Engineering and Mining Journal*:

Our contemporary, *The Iron Age*, has exclusive information of the most remarkable disaster; it is safe to say, which ever befell the mining world. Speaking of the exportation of American ores, it says:

"Of these ores but few have found their way into Germany, partly because of the more intimate commercial relations existing between this country and Great Britain, giving the latter an advantage, and partly because the majority of the miners here prefer to employ the smelting works of that country to their own. Suddenly, however, the mines at Andreasberg, in the Hartz Mountains, began to give out, and as the transfer of the smelting works to some other locality is out of the question, so far as to facts go, the miners of the Andreasberg are located there in permanent settlements, the managers of the Andreasberg works have turned the attention of the officers of the Samana Bay Company, whose charter gives them the right to develop the mineral resources of all San Domingo, an effort is to be made to induce the German Commission to visit that country before returning to Europe. The route prescribed for these gentlemen includes the Spanish American republics, renowned for their mineral wealth, but not San Domingo, Hayti, or the Spanish Antilles. The United States were also omitted, it being proposed that the tour shall be completed within the current year and terminate with the River Plate countries. Since the publication of our article, however, the Samana Bay Company have manifested a lively interest in the matter, and a request will be forwarded to the United German Mining Companies that the Commissioners be instructed to visit San Domingo, where, it is believed, they will find a mineral wealth as great as that to be found in any of the Spanish countries. Possibly, if an effort is made, they may also be induced to visit the United States, in which event the *Engineering and Mining Journal* may have an opportunity to put its readers in possession of some interesting information of date subsequent to 1869, without coming to us for it."

The old proverb, "Go from home to get the news," finds an apt application to a bit of highly interesting and important intelligence which reaches us through the medium of an English daily. "The Americans," says that journal, "have adopted a novel method of showing their appreciation of Mr. Bessemer's services to science. In the midst of one of the richest iron and coal districts in Cincinnati they have begun to build a new city, which, from its geographical position and local advantages, will probably become one of the largest centers of trade in America. To this city they have given the name of Bessemer." We are not surprised that we are to have a new city in the West that is about to "become one of the largest centers of trade in America"—the building of such cities is a matter of every day occurrence; but that a location so extraordinary as one of the richest iron and coal districts in Cincinnati should have been chosen, is certainly calculated to excite unqualified astonishment. Some time ago we saw a statement in an English exchange to the effect that Pennsylvania was the western portion of the State of Philadelphia, the writer being saved from making a very bad mistake by making a very good joke instead. Will not some philanthropist head a subscription to send geographies to England for general distribution?

Scientific and Technical Notes.

A California exchange describes a novelty in the shape of

AN OXY-HYDROGEN SMELTING FURNACE, in which metallic ores are exposed to the action of the oxy-hydrogen flame, which acts upon them with intense heat. The hydrogen is obtained from steam, which is taken from the boiler at a pressure of 80 pounds and passed through a series of pipes, at each turn of which is a flat metal plate. During its passage it is thoroughly disintegrated. The hydrogen is separated from the oxygen of the steam by using the carbon of coal tar, which unites with the oxygen, thus setting the hydrogen completely free. The oxygen of the air then combines with the hydrogen, and their combustion

produces an intense heat. Our California contemporary says: For the smelting of ores this furnace seems peculiarly adapted, and it will easily reduce two tons per hour of any galena ore. The heat produced is so powerful that the ores are reduced rapidly and most thoroughly. The amount of heat can be regulated as easily—and in much the same way—as can the amount of light from a gas-burner. Once regulated, there is never the slightest variation, and the work of reduction can go on without any care being paid to the furnace itself.

Regarding this device, we may remark that no heat is gained in this manner, as the heat necessary to decompose the steam is theoretically no greater than that evolved in the subsequent combination of the two gases. The only advantage obtained is the concentration of the heat in the oxy-hydrogen flame. We are also at a loss to know what is meant by the carbon of coal tar uniting with the oxygen. If the coal tar itself is used, further explanation is necessary to show how the union is accomplished without flame. If coal tar is not employed, we are unable to understand in what form the carbon is used so as to combine with the oxygen without producing sufficient heat to ignite the hydrogen.

MM. Bajault and Roche have submitted to the approval of the French Academy an

IMPROVED PROCESS OF MAKING STEEL, based upon the partial decarburization of the cast iron under the influence of a rich oxide of iron. The advantage which rich ores present for the transformation of cast iron into steel has of course been long known, but the action which they exercise on the sides of the crucible has prevented their use hitherto. This inconvenience does not exist in the method of MM. Bajault and Roche. The cast iron and the ore in powder are placed in metallic molds, and are brought to a red heat in special furnaces. The reaction takes place, and fusion only takes place after their transformation. Ingots are thus obtained which are melted in the crucible, or on the hearth of a reverberatory furnace. These experiments appear analogous to those of M. Poncet.

An interesting item of news reaches us from Canada, to the effect that a valuable deposit of

CANADIAN PLUMBAGO

has been discovered in the township of Buckingham, about eighteen miles to the north of Ottawa, the capital of the Dominion of Canada. The mines, which have been opened, are situated on the River de L'Évier, a tributary of the Ottawa, and are favorably placed, both as regards the working of the ore and its transport. A recent examination of these mines, made by Mr. George Henwood, has disclosed the fact that there are fourteen well defined lodes, in which plumbago of unusual purity occurs in large quantities. Several of the lodes intersect each other, and the mineral in some of them varies in thickness from six to ten feet.

An effort is now making to increase the prosperity of Australia by the establishment of various branches of

IRON MANUFACTURE AT SYDNEY, NEW SOUTH WALES,

where there are extensive iron and coal fields which have hitherto been worked only to a sufficient extent to prove their value. According to the latest information, an almost inexhaustible supply of hematite ores, free from phosphorus, and containing from 58 to 60 per cent. of iron, can be easily obtained, whilst coal, cropping out from the hill sides, in seams from 2 ft. to 9 ft. in thickness, also abounds. Lime-stone, too, is plentiful in the immediate vicinity of the mines, which are about 80 miles from the town of Sydney. From the promises held out by the appearance of the mines, a new field of prosperity is opened to the colony. Already ready energy and industry is rendering it comparatively free of English manufacture; but hitherto all the iron required has been exported from that country. The annual value of iron sent out to this colony from England, is over £1,000,000—an amount which, even if it were not increased by the possibility of obtaining it in the colony, would at the same time enrich the country, and encourage industry. But the demand would soon far exceed the 80,000 tons now imported every year, if the supply was close at hand, especially in the present time of high and uncertain prices.

THE HARDENING OF SWORDS in Solingen is conducted in the following manner: The swords are placed in a coke fire, with tuyeres below, and are heated to a uniform cherry red. Before cooling, the edges are drawn through wet coal dust, whereupon the whole sword, the strong end first, is dipped into water and quickly withdrawn. When five swords have thus been treated, another man anneals them until they appear blue, testing them also in a clamp for their elasticity. Finally, they are annealed gray. The interior thus remains soft, while the exterior becomes hard.

LACQUERING ZINC SHEETS. Various are the means proposed to obtain a durable paint or covering on sheet zinc, viz.: Tinning in the wet way, pickling with muriatic acid, in order to obtain a coarse surface, etc. Mr. Miller, painter of one of the largest dial plate factories in the Black Forest, Baden, now communicates the result of fifteen years' experience in this line to a German contemporary. He says that preliminary pickling with diluted muriatic acid is only suitable for castings. Sheets are treated as follows: The well cut and smooth faces are polished with fine wet sand or pumice stone powder, until all gray spots have disappeared. This treatment is, of course, only applied to the side to be lacquered. With regard to pigments, it should be stated that those consisting of lead, copper and iron cannot be used. It was found that, on slight bending, the pigment scaled off from dial plates that had been lacquered with Carinthian white, probably without preliminary priming. Between color

and plate there was a gray powder, probably a precipitate of lead, formed by galvanic action. Hence, for white goods, zinc white must be used, or very common white lead, containing more baryta than lead. Quickly drying colors are not applicable; use only well drying oil and lacquer varnishes with much body, and allow the goods to dry at a temperature of from 165° to 180° F. The linseed oil varnish used in combination with the pigments should not be boiled with oxide of lead (litharge), but with zinc vitriol or black oxide of manganese. For dark colors and black, Miller applied the brown varnish with success which is used for pottery. Finally, the storing of lacquered zinc articles in damp rooms damages even the best goods.

Manufactured Iron Trade of Sheffield, England.

The progress of the manufactured iron trade of the North of England keeps pace with, and almost threatens to outrun, that of the pig iron trade. It is only within recent years that this branch of the staple industry of Cleveland assumed anything like large proportions. So far back as the year 1840 there were not more than 300 or 400 puddling furnaces between Leeds and Newcastle, and in 1863 the number had increased to 646, distributed as follows:

	No. of puddling furnaces.
Name of works.	50
Walker.	50
Gateshead.	33
Consett.	99
Bishop Wearmouth.	31
Birley.	6
Shotton Bridge.	23
Bedlington.	14
Hive, Jarrow.	10
Sunderland (Tyzack & Co.).	7
Britannia (E. Hopper).	16
Jarrow (Palmer & Co.).	30
Tadhoe.	64
Middlesborough (Bolckow & Vaughan).	68
Witton Park.	71
Tees-side (Hopkins & Co.).	55
Albert Hill, Darlington.	45
Stockton.	20
Total.	646

Within the last ten years the number of puddling furnaces in Cleveland has been more than doubled. It was calculated that the 646 furnaces above named were equal to an annual production of 840,000 tons of finished iron, whereas last year the quantity of puddled iron turned out in the district was about 1,000,000 tons. Mr. Isaac Lowthian Bell stated in a speech which he delivered last year, in connection with the meeting of the Yorkshire Union of Mechanics' Institutes, at Darlington, that there are now close on 2000 puddling furnaces at work in the North of England; that the quantity of coal required to supply these would not be short of 2,000,000 tons per annum; and that they would require the attendance of 20,000 workmen. It will thus be seen that Cleveland is fast approaching South Staffordshire and Wales as regards the extent and importance of its malleable iron trade. So far as the pig iron trade is concerned, Cleveland has already shot far ahead of those older and more famous districts.

It is fitting that the North of England, which has pioneered so many improvements in the economical use of the blast furnace, should also lead the way in the adoption of new and improved processes of manufacturing finished iron. Cleveland is responsible for the introduction into this country of Danks' puddling furnace. It was in April of last year that the Danks furnace was first put to a practical test in the Cleveland district. The trial took place at the works of Hopkins, Gilkes & Co., and was witnessed by many of the largest manufacturers in the country. The results were that Dr. Danks entered into an agreement with Messrs. Hopkins & Co. to erect a complete forge on his system, and since that time he has concluded negotiations for the use of his patent with the following additional firms: The North of England Industrial Iron Company (Limited); the Erinus Iron Company (Limited); Omoa and Cleveland Iron Company; Robert Heath; R. Jacques & Co.; London and North Western Railway Company; Cooke, Swinerton & Co.; while several other firms are now arranging for licenses. Messrs. Hjerleid & Co., engineers, Middlesborough, are the makers of the Danks furnace in the Cleveland district, and at present they have their hands quite full.

As regards priority, the North of England Industrial Iron and Coal Company were the first after Messrs. Hopkins, Gilkes & Co. to arrange for the use of Mr. Danks' patent. They are now having eight furnaces erected at their works at Carlton, near Stockton-on-Tees, and they are so far advanced that it is expected a commencement will be made in the course of next month. The Erinus Iron Company was founded a little more than twelve months ago. They have secured a suitable site between Stockton and Middlesborough, immediately adjacent to the Tees, and building operations were commenced in the spring of last year. The works, which will comprise in addition to twelve Danks furnaces, all the usual appliances for the manufacture of finished iron, and probably, also, in course of time, several blast furnaces, are yet a long way from completion, but they are likely to be in operation before the close of the current year. Messrs. R. Jacques & Co., of the Richmond Iron Works, Stockton, have only erected one Danks furnace in the mean time, being anxious to test its results for themselves before proceeding further. The rest of their forge is built on the usual plan. Beside the firms already named, the West Stockton Iron Company (Limited) are building a new forge and mill; the Stockton Malleable Iron Company have just completed a new mill; Shaw, Reay & Johnson have built within the last twelve months a new forge and mill of considerable dimensions at Stockton-on-Tees; and the Vulcan Iron Company, Middlesborough, are building ten machines with the necessary squeezers and other appliances. But all this does not represent anything like an adequate view of the real extent of the malleable and

foundry trade of Cleveland, as there are few works—perhaps not even a single exception—that have not been considerably extended within the last eighteen months, while other extensions of considerable magnitude are in contemplation.

While speaking of the development of the Cleveland finished iron trade, prominent notice should be given to the malleable works, erected in 1870-'71 by Mr. Bernhard Samuelson, M.P., and lately acquired by a limited liability company. The Britannia Iron Works are located on what was formerly a useless marsh, within a mile of Middlesborough. The forge contains 120 puddling furnaces, and the mill is fitted up with twelve Siemens gas furnaces. The forge is capable of producing 1300 or 1300 tons per week of puddled bars, and it is on the cards to erect at some future time Bessemer steel works.

The directors of the company are now considering the expediency of introducing some of Danks' puddling machines, and the general impression among Cleveland ironmasters is that mechanical puddling must ere long entirely supersede the old system. When we say mechanical puddling, we do not necessarily refer to Danks' system, for there is another rotary puddling furnace that has lately come into considerable prominence, and promises to yield highly satisfactory results. This machine is the invention of Mr. Adam Spencer, now manager of the West Hartlepool Rolling Mills. So far back as 1868, when he was mill manager for Messrs. Bolckow & Vaughan, Mr. Spencer was engaged in maturing his rotary puddling machine, but it was not until 1870 that preparations were made at the West Hartlepool works for putting it to a practical test. The patented maintains that 5 tons per heat can easily be obtained in his converter, which will convert as much iron in a given time as 8 or 10 ordinary puddling furnaces. The proprietors of West Hartlepool Rolling Mills (Messrs. Thos. Richardson & Sons) are so satisfied with the machine that they have resolved on adopting them on a large scale, and if the results already arrived at are maintained, the forge, which now contains 114 furnaces, will be entirely constructed on Spencer's system.

At the works of the West Stratton Iron and Steel Company, another of Mr. Spencer's converters is now being erected. These works were built about two years ago for the manufacture of steel on Hargreave's system, but after a great deal of trouble and loss, the company found that Mr. Hargreave's plan was impracticable, and had, therefore, to abandon it. Since then, they have confined themselves entirely to the manufacture of finished iron, rails and puddled bar being the staple articles of produce. It is probable that the realised value of the malleable iron produce in Cleveland during 1872 is not less than £12,000,000, and by the end of the current year, if present prices are maintained, this enormous item is likely to be very materially increased.—Engineering.

Iron Ore in Wayne County, Pennsylvania.

Mr. W. R. Maffet, of Wilkesbarre, Pa., superintendent of the Wilkesbarre and Seneca Lake Coal Company, has kindly sent us a slip containing an article going the rounds of the newspaper in that region, describing a discovery of brown hematite in Damascus township, along the banks of the Delaware River. It is said to underlie the river bed and to pass over into Sullivan county, New York. Dr. Gregg, of Elmira, has analyzed the ore and found it to yield from 37 to 40 per cent. Mr. Parrott, of the Stirling Mining Company, has visited the place and is said to have pronounced it useful ore. It was discovered by Mr. Fred. Goodell on a recent visit to Calicoon, Sullivan county. He interested Mr. G. W. Rockwell, or that place, to lease meadow land and sink for the ore alongside of the Erie Railroad track, finding a bed of compact hematite. Leases of fifteen farms were made, and as many trial shafts made upon the bed of ore. The strata along the Delaware are nearly horizontal, but have a slight rise which brings them up in succession from the river bed and causes them to outcrop along the walls of rock which shut in the river on both sides—walls mountain high. If the ore bed be really of workable thickness it will be valuable, because it can be entered and mined at almost any place along the Erie Railroad for miles. The terms are one-third cash on delivery of the ore, and the remainder in equal payments at the expiration of 30 and 60 days from the date of the deed, secured by mortgage of the property.

For further information apply to
WM. S. SEYMOUR, Committee.
E. J. GRAPIN,
S. K. PRIEST.
New Hartford, Conn.

For Sale!

Hardware Business!

I offer for sale, on LIBERAL TERMS, an old established Hardware Business, centrally located, and successfully carried on by me for over 20 years, and now doing a good, profitable business in my spacious three story brick Store, metal roof, 44 feet front on Summit Street, extending to Water Street, with splendid basement fronting on latter Street. I will rent the store on reasonable terms for a number of years. The stock is well assorted, and will be worth about \$20,000. This is a rare opportunity for anybody with limited means to step in and do a prosperous business from the start, as I am desirous to go out of business, on account of failing health, and other interests demanding my attention. Will turn over all my agencies, influence, good will, &c. Terms very reasonable. I refer to any Business House or Bank in this city. For further particulars address

HENRY PHILIPPS, Toledo, Ohio.

THE BUFFALO FILE CO.

have placed in my hands the balance
of their stock of
FIRST QUALITY FILES,

For Sale at LOW PRICES.

G. B. WALBRIDGE,
68 Chambers Street, N. Y.

For Sale, &c.

Fire Brick Factory.

The undersigned, being desirous of retiring from active business, offers for sale his two-third interest in the Lehigh Fire Brick Works, in Catasauqua, Pa. Everything pertaining to this establishment is in first-class condition, and the demands for the Bricks has hitherto been in excess of the capacity of the Works to supply. As the Works are situated in close proximity to nearly fifty blast furnaces and twelve rolling mills, the demand is not likely to fall off. An active business man who comes recommended will be dealt with liberally. Apply by letter or otherwise to

DAVID THOMAS, Catasauqua, Pa.

Steam Engine.

A superior six column beam Engine,
24 inch Cylinder and 72 inch Stroke,

made by Maudslay, Sons & Field, London.

This Engine is one of the finest in the country, of great strength, and well adapted for mining or heavy factory work.

Attached to Beam are two Pumps, 26 inches diam. and 54 inch stroke, beside Well and Force Pump, also attached to Beam.

In perfect order, and will be sold at a reduced price, if applied for immediately,

150 feet 5 in. turned Wrought Iron Shafting,

50,000 Fire Brick, (second-hand) in good order.

R. L. & A. STUART, 169 Chambers St., N. Y.

For Sale,

The Orange County Foundry and

Machine Shop,

MIDDLETOWN, N. Y.

Established 1842.

The most desirable property on the line of the Erie and Midland Railways. Has a large and valuable assortment of Patterns. Extensive and increasing trade, and affords parties wishing to enter the Iron Business an unusual opportunity. Satisfactory reasons given for selling.

Parties desiring to purchase are requested to call and examine, or address the undersigned,

E. P. WHEELER, Middletown, N. Y.

FOR SALE.

The Napanoch Blast Furnace, Ulster Co., N. Y. Splendid water power. Charcoal and Anthracite Coal in abundance, cheap. Apply to H. Bangs, 34 Tompkins Place, BROOKLYN, N. Y.

VALUABLE REAL ESTATE.

VALUABLE REAL ESTATE

AND PERSONAL PROPERTY

AT AUCTION.

Ten Eyck Axe Manufact'g Co., Cohoes, N. Y.

The undersigned, executors of the estate of the Ten Eyck Axe Manufacturing Co., bankrupts, will sell at public auction (unless previously disposed of at private sale) on the premises, in the city of Cohoes, N. Y., on the 13th day of March, 1873, at 10 o'clock a.m., the valuable real estate and water power recently occupied by said Company. Also the valuable machinery, tools, and implements used by them in their business. Also a large quantity of edge tools in great variety, being stock of manufactured goods on hand. Also eighty-five large grills, grates, and other material, office furniture and fixtures, &c., &c. Must be sold without reserve to close the estate. Terms made known on day of sale, or before, on application to

P. P. ALLEN,
Assignee of Ten Eyck Axe Mfg. Co.,
235 River st., Troy, N. Y.

For Sale

By the undersigned. Sealed bids, accompanied with a good bond as surety for the fulfillment of the bid in case the same should be accepted, will be received until March 1st, 1873, for the following described property:

The works of the Greenwood Scythe Co., situated at New Hartford, Conn., on the New Haven and Northampton and Conn. Western R. R., the latter within 100 feet of the works, and it is expected will soon have connection with the Poughkeepsie and Eastern at Millerton, so that coal can be transported at a very low price. The buildings consist of a Hammer Shop, 90x68 feet, and has three complete sets of Hammers; a Grinding House, 130x34 feet, with ten run of stones, with new spindles and all the tools for handling, etc., etc.; and a polishing and paint room of sufficient size to handle twelve thousand dozen in ten working months. The buildings were erected in 1869, and are in good order. There is a 40 inch Lefell Wheel, under 22 feet head, with good gearing, shafting and pulleys, with large and small driving belts, in readiness to start at once; also an office and warehouse, 90x38 feet, three stories high, in good order, and three Dwelling Houses and a Barn.

The water power is excellent, never failing, being on the Farmington River, and below the well known Otis and West Hill Reservoirs, the latter being under the exclusive control of the company.

The Brands, Stamps, Good Will, Labors, etc., etc., of the company, such as has been in use by them since commencing business, are also included in the sale. The terms are one-third cash on delivery of the ore, and the remainder in equal payments at the expiration of 30 and 60 days from the date of the deed, secured by mortgage of the property.

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E. J. GRAPIN,
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HENRY PHILIPPS, Toledo, Ohio.

Rolling Mill Machinery For Sale

One train, 8 high, finishing rolls, with steam engine 75 H. P.; and balance wheel, 30,000 lbs.—complete and in good order—by

Fearing, Hodman & Swift,
23 & 25 Commercial Street, Boston.
Boston, Nov. 20, 1873.

For Sale, &c.

TO LEASE

On very reasonable terms,

A Large Factory.

On line of railway between New York and Philadelphia.

Just the Site and Building for a large

Machine Business.

Main building 150x50 feet, with two wings for

Foundry and Forge

A never-falling Water Power supplies

the Factory with power.

Address, immediately,

FERGUSON,

89 White Street, New York.

To Rent or For Sale.

FACTORY, with twenty horse Water-Power, drawn from never failing Reservoir.

Building, 50x62, 3 stories, well lighted, desirably located in Connecticut, less than one mile from depot. Address

P. O. Box, 3110, New York City.

Rolling Mills For Sale or

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, March 5, 1873.

The past week has been one of much interest in Wall street, especially as regards the Treasury operations and their effect upon the local market. On Saturday notice was given by Mr. Boutwell that \$50,000,000 of 5-20s will be redeemed by the Treasury on the 1st of June, in accordance with an arrangement made with the "Syndicate," which has been entrusted with the duty of negotiating the new 5 per cents. The following is a list of the bonds called:

SECOND SERIES 5-20s of 1862, COUPON.

Denomination.	Numbers.	Amount.
\$50s.....	10,776 to 27,798	
100s.....	35,936 to 66,646	
500s.....	16,180 to 41,373	
1,000s.....	37,444 to 71,259	

THIRD SERIES 5-20s of 1862, COUPON.

50s.....	1 to 1,900
100s.....	1 to 4,752
500s.....	1 to 3,000
1,000s.....	1 to 5,733
Total coupon bonds.....	\$45,000,000

REGISTERED 5-20s of 1862.

50s.....	841 to 1,233
100s.....	5,992 to 8,903
500s.....	2,959 to 5,360
1,000s.....	18,151 to 30,680
5,000s.....	4,103 to 6,402
10,000s.....	4,775 to 7,092
Total registered.....	5,000,000

Grand total..... \$50,000,000

Notice was also given on Saturday that interest on \$300,000 3 per cent. certificates will cease April 30, leaving only \$325,000 to be withdrawn. The March programme of gold sales and bond purchases is as follows:

BOND PURCHASES.

Wednesday, March 5.....	\$1,000,000
" 12.....	500,000
" 19.....	1,0,000
" 26.....	500,000
Total.....	\$3,000,000

GOLD SALES.

Thursday, March 6.....	\$1,500,000
" 13.....	1,500,000
" 20.....	1,500,000
" 27.....	1,500,000
Total.....	\$4,500,000

The money market has been stringent throughout the week, and borrowers on call have paid as high as 1/4 of 1 per cent. per day—the rate averaging 1-16. Mercantile paper is dull, and only nominal quotations can be given. The bank statement shows that the banks are in point of lawful money \$1,547,500 nearer to the 25 per cent. reserve required by law than last week, or, in other words, that they now lack only \$12,350 of the 25 per cent. reserve, while last week they were short \$1,850. The increase in specie is due in part to the prepayments of 10-40 interest, which began Monday.

The gold market has been strong and foreign exchange weak. The following are the daily fluctuations in the premium:

Highest. Lowest.

Thursday.....	111%	114%
Friday.....	114%	114%
Saturday.....	115%	114%
Monday.....	115%	114%
Tuesday.....	115%	114%
Wednesday.....	115%	115%

The stock market has manifested considerable activity. The "break" in Pacific Mail was the principal subject of interest. After this the most active stocks were Lake Shore, Western Union, Erie, Ohio's, C. C. & I. C., and Union Pacific.

The bond market has been steady and without important feature. The following is a comparison of the bank averages of the past two weeks:

Feb. 21.	March 1.	Differences.
Loans..... \$396,870,100	\$384,344,900	Dec. \$5,525,300
Specie..... 15,046,900	16,370,500	Inc. 1,323,600
Circulation..... 27,573,100	27,401,300	Dec. 2,870,000
Deposits..... 305,898,700	302,066,100	Dec. 3,832,600
Leg. Ten. 41,461,300	40,734,000	Dec. 737,300

In foreign trade the movements for the week are as follows:

IMPORTS.

1871.	1872.	1873.
Tot. for week..... \$9,945,496	\$14,600,713	\$9,394,736
Prev. reported..... 48,325,504	54,343,905	63,675,962

Since Jan. 1.... \$58,997,940

Included in the imports of general merchandise for the week are:

Brass goods..... \$5 \$4,945

Bronze..... 5 1,220

Chains and anchors..... 363 12,503

Copper..... 214 78,632

Cutlery..... 2 218

Gas fixtures..... 52 12,710

Guns..... 97 8,189

Hardware..... 96 1,725

Iron, hoop tons..... 1,160 37,332

Iron, pig tons..... 161 15,454

Iron, sheet tons..... 9,092 132,700

Iron, cotton ties..... 971 3,168

Iron, tubes..... 1,500 3,384

Iron, other, tons..... 1,412 67,801

Lead, pigs..... 6,282 45,321

Lead, tons..... 8 791

Metal goods..... 169 94,233

Nails..... 3 342

Needles..... 26 16,848

Old metal..... 3,434

Platina..... 2,262

Personage caps..... 5 729

Saddlery..... 2,708 56,854

Spelter..... 110,500 5,126

Silverware..... 2 132

Tin boxes..... 34,466 228,656

Tin, 2000 slabs..... 78,968 44,834

Wire..... 101 5,070

Zinc..... 55,119 3,378

EXPORTS, EXCLUSIVE OF SPECIE.

1871.	1872.	1873.
For the week..... \$4,469,192	\$5,075,113	\$5,254,908
Prev. reported..... 35,008,091	32,512,321	39,047,061

Since Jan. 1.... \$59,477,968

EXPORTS OF SPECIE.

Total for the week.....	\$62,487
Previously reported.....	9,706,167

Total since January 1, 1873.... \$10,381,654

Government bonds at the close were firm.

We quote :

Bid. Asked.

U. S. Currency 6s..... 113% 114%

U. S. 6s, 1881, reg..... 115% 116%

U. S. 6s, 1881, c. 115% 118%

U. S. 5-30 1854, reg..... 115% 115%

U. S. 5-30 1854, c. 115% 116%

U. S. 5-30 1867, r. Jan. and July..... 114% 114%

U. S. 5-30 1867, c. Jan. and July..... 114% 114%

U. S. 5-30 1867..... 116% 116%

U. S. 10-40 reg..... 110% 112%

U. S. 10-40 c..... 111% 112%

U. S. 5s of 1861, reg..... 113% 114%

U. S. 5s of 1861, c. 113% 114%

U. S. 5s of 1861, reg..... 113% 115%

The following were the highest and lowest prices of stocks to-day:

Highest.	Lowest.

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Messrs. Barrow's price for bars is £13, and Lord Dudley, £14 2s. 6d. Hoops, which are in better demand for the United States, are realizing (at Birmingham) £13 10s. to £15; tube strip, £14 to £16, and nail iron, £12 to £14.

Pig iron is very scarce and firm in price. Messrs. Ward, Messrs. Addenbrook, Messrs. Fowler and Messrs. Hickman (all leading houses) have none to sell, and do not care to quote. In the East Worcestershire district alone it is stated the demand for pig exceeds the supply by 4000 tons per week, and as a matter of course prices are going up. The inquiry for coarse iron is improving in the district under notice, and should orders be equal to inquiries, prices will possibly go up yet higher. From the United States a few specifications for iron have come to hand, and from France, Germany and Holland for machinery and tubing. Italy, Greece, and Southern Europe generally, are still taking a fair quantity of agricultural implements. One of the sequences of higher prices is a revision of price lists and discounts of heavy hardware—galvanized sheets, iron wire, malleable iron castings, and the like. Iron-wood screws have, on the contrary, been reduced for the English market, the discount having been made 40, instead of 30, per cent. The monopoly of this branch is held by Nettlefold & Chamberlain, whose productive powers are now so extremely large that they must perform lower prices in order to keep their establishment going. There is an excellent demand for wire for fencing and telegraphic purposes, as also for gas, water and other pipes and boiler tubes. Nut and bolt makers are strenuously endeavoring to clear off the great lot of orders which had accumulated during the seventeen weeks' strike, and the whole of the miscellaneous trade of Birmingham, Wolverhampton, Dudley, Walsall, Willenhall, and other towns of the Black Country, remain in a healthy state. The general metal market at Birmingham is decidedly somewhat weaker, transactions being on a very limited scale. Copper is lower than last week. Chill Bar is worth 42s. 10s. to £27; Wallaroo, £29 10s. to £29; English, unchanged. Tin is quiet; Straits realize £14 10s. to £14 10s.; Billiton, £14 10s.; Banca, £14 10s.; English, £14 10s. Nut and bolt makers are firm, common Siberian being worth £25 at our ports; W. H., £26; Rhenish £24 10s. to £24 15s. both at London and our ports, and English £25 10s. to £26, delivered in Birmingham. Lead is firm, but not in great demand. The stock of spelter at London is 584 tons; Hull, 700 tons, and Grimsby, 280 tons. The figures given hereunder are taken from Messrs. Rogers & Co.'s Birmingham circular, and refer to copper.

The Chill charters for 1872, including 1000 tons advise for the last half of December, were 43,040 tons. The shipments and charters together were 50,201 tons, of which it is computed 26,46 tons will figure in the shipments of 1873. The estimated stock on the 16th December was 3622 tons, and as 1000 has since been chartered, it leaves a stock of 2622 tons, against 10,750 tons, 1st January, 1872. The imports into England for the five past years, were as follows:

1868.	1869.	1870.	1871.	1872.
Tons. 62,922	Tons. 64,274	Tons. 61,082	Tons. 54,116	Tons. 68,413
The exports for the twelve months, for the following years, were:				
1868. 56,614	1869. 52,901	1870. 50,173	1871. 54,610	1872. 45,273

The positions from 1st February, 1872, to 1st February, 1873:

Price. hand.	Stock on Stock inc. afloat.	Stock inc. afloat.
1868. 1872. 233	1869. 1870. 233	1871. 1872. 233
Tons. 88	Tons. 97	Tons. 106
March 1st, 1868. 20,047	1869. 20,647	1870. 20,647
April 1st, 1868. 20,497	1869. 20,497	1870. 20,497
May 1st, 1868. 21,435	1869. 21,435	1870. 24,205
June 1st, 1868. 21,435	1869. 21,435	1870. 23,495
July 1st, 1868. 23,318	1869. 23,318	1870. 37,447
August 1st, 1868. 27,783	1869. 27,783	1870. 39,733
September 1st, 1868. 27,922	1869. 27,922	1870. 39,989
October 1st, 1868. 29,542	1869. 29,542	1870. 41,409
November 1st, 1868. 29,940	1869. 29,940	1870. 40,051
December 1st, 1868. 30,735	1869. 30,735	1870. 40,453
January 1st, 1869. 32,001	1869. 32,001	1870. 41,991
February 1st, 1869. 32,432	1869. 32,432	1870. 42,012

And the comparative positions at the same date of the past four years, with the present:

Stock inc. afloat.	Stock inc. afloat.	Stock inc. afloat.
1868. 34,243	1869. 34,243	1870. 34,243
February 1st, 1869. 22,142	1869. 22,142	1870. 22,142
February 1st, 1870. 31,157	1870. 31,157	1871. 43,637
February 1st, 1871. 34,979	1871. 34,979	1872. 44,421
February 1st, 1872. 39,063	1872. 39,063	1873. 39,503
February 1st, 1873. 32,422	1873. 32,422	1874. 42,012

A Sheffield steel trade remains fairly busy. The Association of Steel and Iron Manufacturers, to whom I have more than once alluded, does not appear to have effected much, and has no determinate influence on the coal owners, who continue, much as heretofore, to advance coal and coke when they think proper. The Steel Manufacturers Association has, however, got so far as to fix the subscription of each member at £5. for each melting hoist and converting furnace in his possession, whether in use or not. This, it must be confessed, is a step forward, but I don't precisely understand how they propose to mollify the obdurate coal owners. I have before said, we shall see." I repeat the observation. In the heavy iron trades there is a prevailing briskness—not observable in the cutlery branches of business—and in the Bessemer departments great activity prevails. For files and saws the inquiry is hardly so well sustained as heretofore, but edge tools and sheep shears are being very largely turned out. The rail mills are going night and day, prices ranging from about £11 to £11 10s. The whole of the works in South Yorkshire are busy, many of them now using North Lincolnshire ore. Best Yorkshire bars are worth £14 to £14 10s., and sheets £17 to £18, hoops ruling at £12 to £14. In the Cleveland district an unparalleled amount of activity exists. Makers' stocks have decreased 6000 tons, No. 1 being now worth £6. 7s. 6d. to £6. 10s., and No. 2, £6. Average quotation for rails are £12 to £12 10s.; angles, £13 to £13 10s.; merchant bars, £12 10s. to £12 15s.; puddled bars, £9 to £9 5s., and ship plates, £14. So difficult is it to carry on business at a profit in the face of the rapid increase in the prices of fuel and pig iron, that some of the Middlesbrough finishers iron makers contemplate discontinuing their operations for a time. This *dernier ressort* will, however, not need to be taken, should the price of finished iron be forced up in proportion. Shipbuilders continue busy. The Scotch market has been unsettled during the week, quotations for warrants having gone up as high as 137s., but have since somewhat receded. The stock of pig iron in Scotch stores is 95,700 tons, with warrants in circulation for 75,100 tons, but as the blast furnaces are all getting partly to work again, we may reasonably anticipate a fall in prices, not, however, to their normal condition. Quotations for makers' brands of Scotch pig are: Gartsherrie, No. 1, 157s. 6d.; No. 3, 138s.; Coltness, No. 1, 160s.; No. 3, 140s.; Summerlee, No. 1, 160s.; No. 3, 138s.; Carnbroe, No. 1, 147s. 6d.; No. 3, 138s.; Glengarnock, No. 1, 148s. 6d.; No. 3, 138s.; Eglinton, No. 1, 137s. 6d.; No. 3, 135s. 6d.; Dalmellington, No. 1, 140s.; No. 3, 137s. 6d.; Carron, No. 1, 155s.; Shotts, No. 1, 150s.; No. 3, 137s. 6d.; and Kinnel, No. 1, 145s.; No. 3, 137s. 6d. Shipments for the week still show a slight decrease. The malleable iron trade is in a dull condition. Plates, bars and angles are in request, and the ships yards have plenty of work. Otherwise, there is nothing specially noticeable in the state of the iron trade "North of the Tweed."

Fire Brick.

**B. KREISCHER & SON.,
New York Fire Brick &
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CLAY RETORT WORKS,
Established 1845.**

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The largest stock of Fire Brick of all shapes and sizes on hand, and made to order at short notice.

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and others. FIRE MORTAR, GRANITE BRICK, CLAY and
SAND. SUPERIOR KAOLIN for ROLLING MILLS and FOUNDRIES.
STONEWARE and OTHER FIRE CLAY and SAND,
from my own mines at NEW JERSEY and STANISLAW ISLAND,
by the cargo or otherwise.**

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FIRE BRICKS
And Clay Retorts.
HAMMILL & GILLESPIE,
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Are constantly receiving all the best brands of
Foreign Fire Bricks, Clay Retorts, Fire and
Crucible Clays, Portland and
Roman Cements.
&c., &c., which they offer in lots to suit, from store or
to arrive, at greatly reduced prices.

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CRUCIBLES.**

Manufactured by
ADAM NEWKUMET,

1537 & 1539 N. Front St., Phila., Pa.,
For Steel, Brass, Nickel, Copper, Bronze, &c.
Equal to any in the market, and all guaranteed.

Keeping a full stock of all sizes on hand, and
being confident of giving entire satisfaction, we re-
spectfully ask consumers to give us a trial

Salamander & Albany Fire Brick Works

Rathbone St., Albany, New York.

PALMER, NEWTON & CO.,

Manufacturers of FIRE BRICK of every shape
for Gas Works, Tanneries, Lime Kilns, Rolling Mills,
Blast Furnaces, Glass Works, Stove, Range and Heat-
ing Linings; Fire Clays, Kaolin, Fire Sand, Fire Cement, &c.
equal to any in the market, and all guaranteed.

Any variation from the regular size or shape
of the above named goods cut from sample to order.

Established in 1842.

HOBART'S TACKS.

Manufactured by
Dunbar, Hobart & Whidden,

Office and Salesroom,
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Factory, SOUTH ABBINGTON, MASS.

Manufacturers of

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BRUSH, LACE AND GIMP TACKS,
Leathered, Tinned, and Iron Carpet Tacks; Fin-
ishing, Black, and Tinned Trunk Nails;
Hungarian and Cigar Box Nails;

COPPER and IRON BOAT NAILS;
ZINC, COPPER, STEEL, and IRON SHOE NAILS
2d and 3d FINE NAILS;

Bright and Tinned Roofing Nails,

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Manufacturers of Copper, Brass, and Iron Rivets; Com-
mon and Swedes Iron, Leathered, Carpet, Lace and
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Barrel Nails; Glaziers' Points, Iron, Steel, Copper,
Zinc and Brass Shoe Nails, HEEL and TOE
PLATES, STEEL SHANKS, and
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JAPANNED LINING and SADDLE
NAILS.

A full assortment always on hand at salesrooms,

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Odd and irregular sizes made to order or cut from
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ROCKINGHAM WAR, FIRE CLAY, FIRE SAND, KAOLIN and

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Manufacturers of Pennsylvania Brick Machine,

Little Giant Pipe Machine, Fire and Red Brick

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**STEAM ENGINES,
And MACHINERY of every Description.**

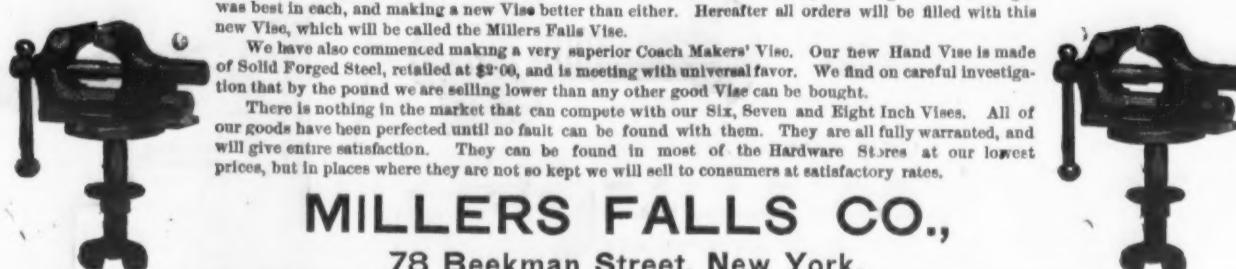
New York Office,



During the past year we have consolidated the Union and Backus Vises, retaining what we thought was best in each, and making a new Vise better than either. Hereafter all orders will be filled with this new Vise, which will be called the Millers Falls Vise.

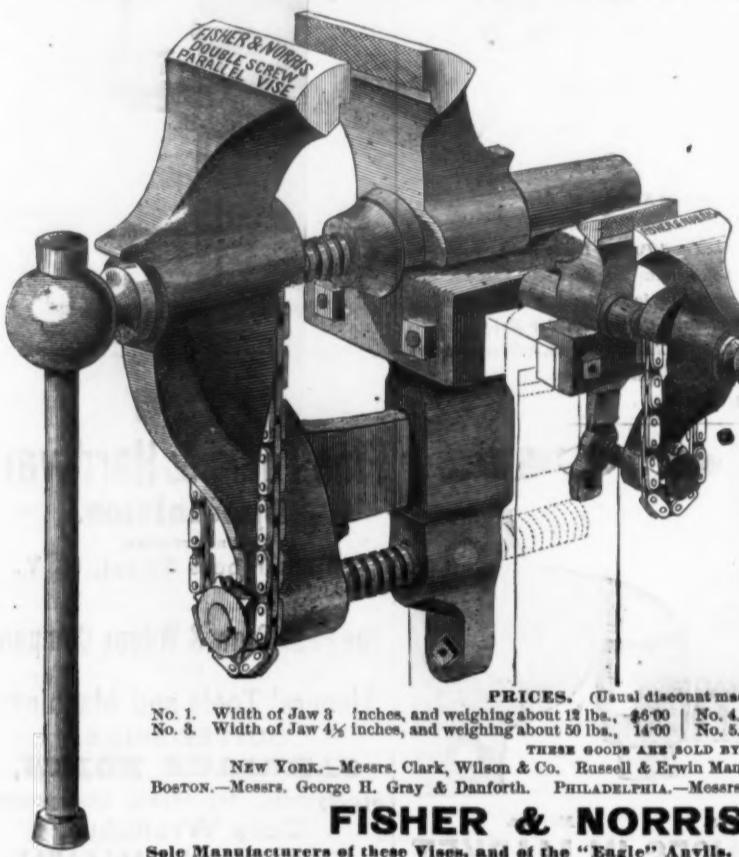
We have also commenced making a very superior Coach Makers' Vise. Our new Hand Vise is made of Solid Forged Steel, retailed at \$2.00, and is meeting with universal favor. We find on careful investigation that by the pound we are selling lower than any other good Vise can be bought.

There is nothing in the market that can compete with our Six, Seven and Eight Inch Vises. All of our goods have been perfected until no fault can be found with them. They are all fully warranted, and will give entire satisfaction. They can be found in most of the Hardware Stores at our lowest prices, but in places where they are not so kept we will sell to consumers at satisfactory rates.



MILLERS FALLS CO.,
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THE DOUBLE SCREW PARALLEL VISE.



PRICES. (Usual discount made to the Trade.)
No. 1. Width of Jaw 3 inches, and weighing about 12 lbs., \$18.00 | No. 4. Width of Jaw 5 inches, and weighing about 80 lbs., \$18.00
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Manufactured at the

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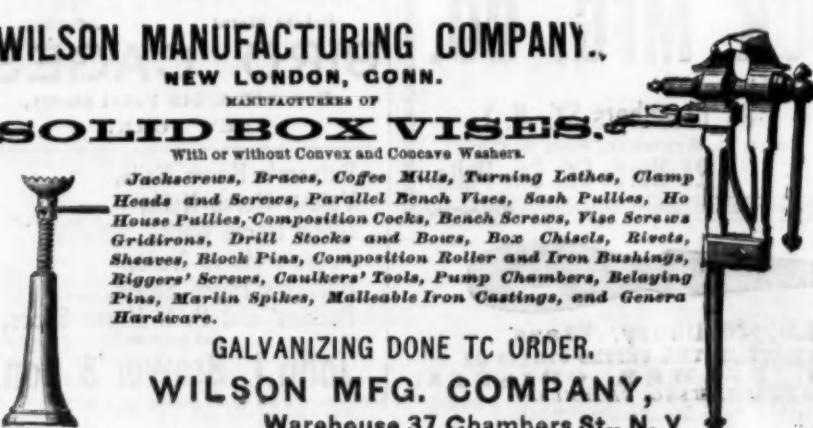
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With or without Convex and Concave Washers.

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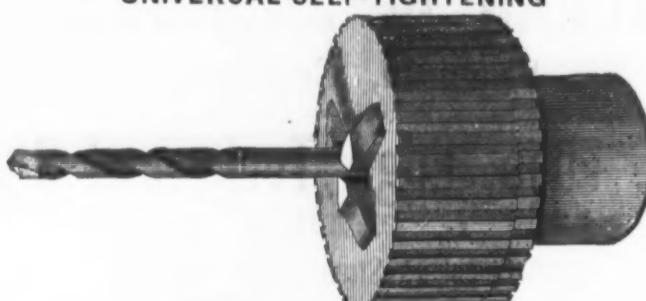
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Middletown Tool Co.,
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DRILL CHUCK.

(Superior to all others, and the only practical Chuck.)

All the motions in this Chuck are positive. It has no spring or complicated mechanism to break, or get out of order. The Large Chuck is on the same principle precisely, and has an arrangement of the jaws for chucking small articles, for turning, boring, &c. The Small Chuck holds drills from $\frac{1}{8}$ shank down. The Large, from $\frac{3}{8}$ down to 5-16. Price—Small, \$6.00. Large, \$8.00.

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Self Adjusting

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CRANK,

3, 4, 6, 8 quart.

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3, 4, 6, 8, 10, 12 quart

16, 20, 24, 32, 40 quart

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Gentlemen: In reply to your inquiry, "How do you like our Champion Freezer?" would say, I have tried all the different kinds of freezers in the market, but found none to answer my wants, consequently had one made at an expense of over two hundred dollars, that suits me. Your Champion embraces a good quality contained in my own, and I consider it the best I have seen. Yours, respectfully,

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PLATE AND HOOK HINGES,**

Cold Pressed Nuts and Washers, Felloe Clips, &c.

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Spiegel Iron and Puddled Steel Scrap for Cast Steel Manufacture.

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Wrought Butts, Strap and T Hinges.

Bronzed Butts and Bolts.

Wrought Barrel, Square and Shutter Bolts.

Wrought Chest Handles, Washers, Flush Bolts, &c.

79 CHAMBERS STREET, NEW YORK.

Factory at New Britain, CONNECTICUT.

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**Anvils, Chains, Pocket Cutlery,
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BIRMINGHAM, SHEFFIELD & GERMAN HARDWARE,
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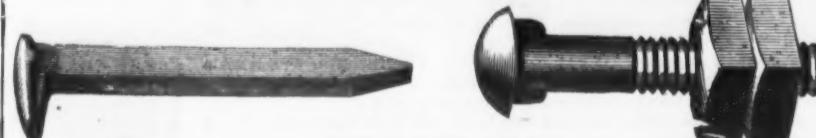
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PAD LOCKS,Drawer, Trunk, House,
STORE DOOR AND OTHER LOCKS,
NIGHT LATCHES, &c.,with Small Flat Keys. Also
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Manufacture Bar, Angle, and Plate Iron, Spikes and Nails, Railroad Fish Plates, Bolt
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Plates Punched and Cut Hot. Bolts and Spikes, Superior Stock



COLD PUNCHED NUTS.

All sizes constantly on hand. We use the best Lake Superior Iron, and make a uniform handsome nut. Orders solicited. We make washers a specialty. Also

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D. H. GOODELL,
ELEPHANT EDGE TOOLS,
Horse Shoes, Horse Nails.

Iron, Nails, Horse Shoe Nails, Nuts, Washers, Crow Bars, Tuyere Irons, &c.

Finished, Polished and Pointed Horse Nails.

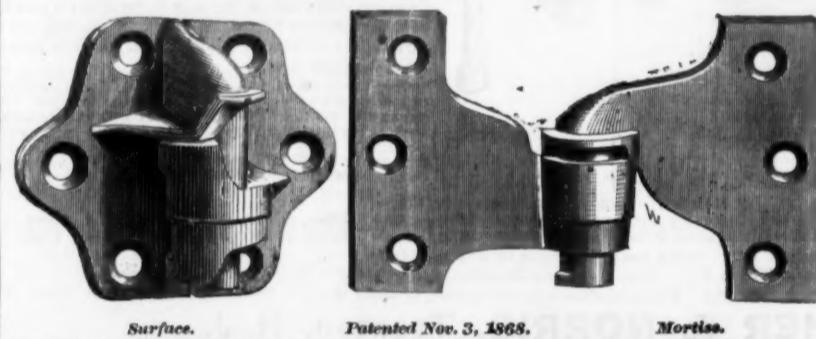
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Hot-Water-Proof Table Cutlery, Butcher Knives, &c.

Lightning & Turn-Table Apple Parers, & Cherry Stoners.

Axes, Hatchets, Picks, Mattocks, &c.

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Surface.

Patented Nov. 3, 1868.

Mortise.

THE STRONGEST BLIND HINGES IN MARKET.

Upper and Lower Hinges are alike, locking the top and bottom of the Blinds.

On long Blinds three or more may be used without mismatching sets, and all will fasten. They cannot be broken or closed by the wind.

We would call the attention of the trade to our Improved Reversible Self-Closing Gate Hinges. Also our Improved Axle Pulleys, both Iron and Boxwood Wheel, Sash Locks, Sash Bolts, &c.

CLARK & CO., Buffalo, N. Y.

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YALE LOCK MFG. CO.Office and Works
at STAMFORD,
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No. 1 Barclay
New York.**FINE FLAT-KEYED LOCKS** for all PurposesRIM and MORTISE STORE DOOR LOCKS,
Heavy Front Door and Vestibule Locks.

Rim and Mortise Night Latches,

CLOSET, CHEST, DRAWER, DESK and PADLOCKS,

Post Office Lock Boxes and Prison Locks,

Leeds' Gate Fixtures, Field's Shutter Bars, etc., etc.

The Yale Lock Manufacturing Co.,
STAMFORD, CONN.The Best
TUMBLER
LOCK
Ever Made.

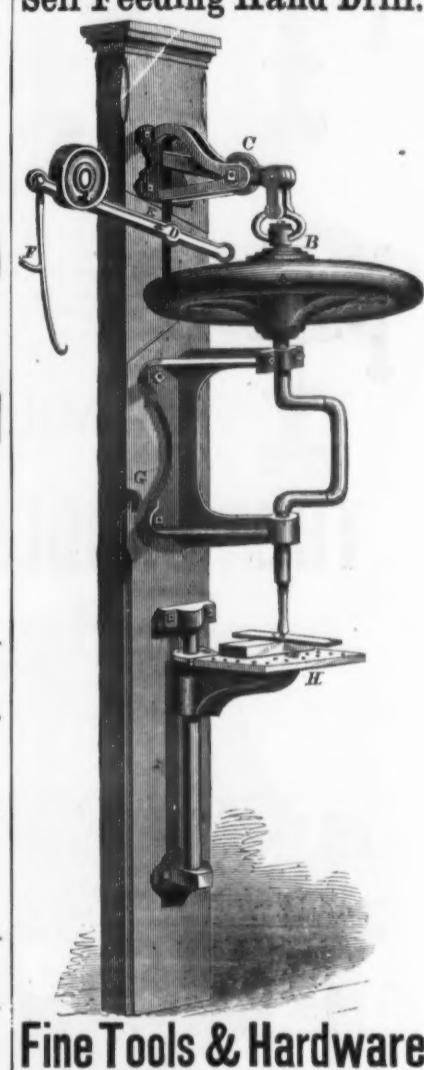
New Pattern Key.

No. 500 Yale Lock.

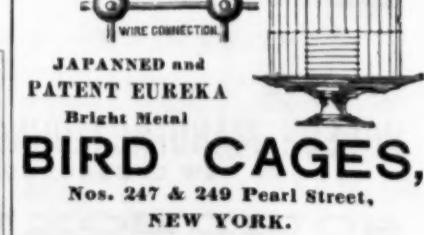
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LARGEST STOCK AND BEST ASSORTMENT IN THE UNITED STATES OF
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Also, BEST QUALITY SOCKET FRAMING CHISELS.

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PATENT
Self Feeding Hand Drill.****Fine Tools & Hardware****Specialties.**Warerooms,
78 Chambers Street, N. Y.
Send for catalogue.**The Peck Stow & Wilcox Company**Tinners' Tools and Machines,
COFFEE MILLS,
CARRIAGE BOLTS,
Steeleyards, Dividers, Compasses,
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WROUGHT and MALLEABLE.
STEEL and IRON SQUARES.
And a large variety of**General Hardware.**

Send for a Catalogue. 97 Chambers St., N. Y.

**JOHN MAXHEIMER**Manufacturer of
FRANKLIN S. MILES,
SCREWS,
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NEW YORK.Putnam's Horse Nails,
Vulcan Horse Nails,
Globe Horse Nails,
Usable Horse Nails,
Burden's Horse Shoes,
Perkins' and R. I. Horse Shoes,FOR SALE BY
John I. Brower & Son,
288 Greenwich St., N. Y.

New York Wholesale Prices, March 5, 1873.

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Anvils.

Solid Cast Steel.	\$10 14c
Wright's... \$1 lb gold 13 @ 12½ c; over 250 lbs. 13c. gold	
Armitage's Mouse Hole.	gold 12c
Wilkinson's.	lb gold 11½ c
Eagle Anvil Co., \$1 lb 11 cts.	dis 15 @ 15&5 c

Apple Parers.

Turn Table.	
Lightning.	\$8 50 per dozen.
Reading.	
Conqueror.	
Union.	per doz. \$8 00 @ 8 50
Bay State, Paring Coring & Slicing.	13 50 @ 15 00
Skeleton.	8 00
Bay State Peach Parer.	11 00 @ 11 50
Lightning Peach Parer.	11 00 @ 11 50
Peach Stoner & Halver.	6 00

Augers and Bits.

Snell Mfg. Co.	dis 15 c
Russell Jennings.	dis 10 5 c
Ives.	dis 25 c
" Hollow Augers.	dis 30 c
" Expansive "	dis 30 c
" Expansive Bits.	dis 25 c
Andrews' Bits.	dis 30 c
Cook's Patent Augers.	dis 40 c
" Bits.	dis 25&10 c
Shepardson's Double Cut Bits.	dis 20 c
Griswold's Patent.	dis 20 c
Cast Steel Cut Anglers.	new list dis 25&10 c
Cast Steel Auger Bits.	dis 25&10 c
Long Augers.	new list dis 30 c
Bonnev's Patent Hollow.	\$48 per doz.—dis 25 c
Stearns' Patent Hollow.	\$48 per doz.—dis 30 c

Axes.

Blood's.	\$12 50 @ 14 00
Hunt's.	\$12 50 @ 17 50 net @ dis 5 c
Collins'.	\$12 00 @ 16 net @ dis 5 c
Hurd's.	\$12 50 @ 13 50
Simmons'.	\$12 00 @ 13 00
Morris'.	\$12 50 @ 13 50
Red Jacket.	\$12 00 @ 13 50
Mann's.	\$12 00 @ 14 50
Powell Tool Co., "Peerless".	\$12 00 @ 14 50

Balances.

Chatillon's.	
Frary's.	{ new list, dis 15 c
Morton's.	

Hands.

Plated.	add 10; dis 5 c
Iron.	dis 5 c
Brass... (Plated list).	dis 5 c
Oroide.	add 15; dis 5 c

Bells.

Hand, Light Brass.	dis 55&10 c
White Metal.	dis 45&10 c
Globe.	dis 10 c
Abbe's.	dis 10 & 13 c
Taylor's Patent Door.	dis 10 c
Western Gong.	net
Brook's Crank.	net list.
" Pull."	dis 15 c
Hart Mfg. Co., Crank and Pull.	net list
Cow—Common Wrought.	new list dis 33½ c
Western.	new list dis 33½ c
Kentucky "Star".	new list dis 10&10 c
Dodge's Genuine Kentucky.	new list dis 20 c
Yaw's Genuine.	dis 20 c

Bellows.

Blacksmiths.	dis 10 c
Moulders'.	dis 10 c
Blind Fasteners.	
Van Sandt's.	\$ gross \$14 00
Washburn's Patent.	\$ gross 14 00
Merriman's.	add 35 @ 40 c

Blind Staples.

Boardman's Patent, % in. and larger.	\$ lb 37½ c
" % in.	" 42 c
Bolts.	
Cast Iron Barrel, Shutter, &c.	old list dis 30&10 c
Wrought Iron Barrel.	net
" " Square.	dis 10 & 10 c
Carriage and Tire, Common.	dis 60 c
Carrage and Tire, Norway Iron.	dis 40 c
Eagle, Philadelphia.	dis 40 c
Philadelphia Pattern, P. S. & W.	dis 50&5 c
Carriage and Tire, R. B. & W.	dis 50&5 c
Plow, R. B. & W.	dis 10 c
Stove, R. B. & W.	dis 10 c
Union Nut Co.	dis 15 @ 15 c
Machine.	

Boring Machines.

Kellogg's.	dis 10 @ 15 c
Snell Mfg. Co., Rice's Patent.	dis 15 c
Snell Mfg. Co., Regular.	dis 15 c
Douglas Mfg. Co.	dis 20 c
Hovey's Angle.	\$6 00 @ 6 25
Hovey's Upright.	4 25 @ 4 50
Morticing Machines, each.	\$18 00

Braces.

Barber's Patent.	dis 30&10 c
Wilson Mfg. Co.	net @ add 5 c
Spooff's Patent.	dis 37½ c
Nolle's Patent.	dis 33½ c
Bartholomew's.	dis 10&10 c
Bartholomew's Patent.	dis 25 c
Q. S. Backus & Co.	dis 30&10 c

Bung Hole Borers.

Common and Ring.	dis 20 c
Enterprise Mfg. Co.	dis 20 c
Ives' Tap Borers.	dis 20 c
Butchers' Cleavers.	
Bradley's.	dis 15 c

Cutteries.

American Best.	\$5 00 to £ net
Nicholson-Mill.	5 00 to £ net
" Others.	5 00 to £ net
Pratt's Aerating.	dis 10 c
Dover.	\$ doz net \$6 00

Emery.

General Chester—Regular Nos.	\$ lb 8c
" Flour and FF.	\$ lb 5c
Washington Mills—Regular Nos.	\$ lb 8c
" Flour.	\$ lb 5c
Knives.	

Enamelled and Tinned Ware.

Kitchens.	dis 10 c
Sance Pans, Glue Pots, &c.	dis 5 c
Faucets.	
Rock Lined, Wood.	dis 50 @ 50&10 c
Fenn's.	dis 50 c
" Cork Stop.	dis 40 c
Star.	dis 55&10 c
Frany's Patent Petroleum.	dis 10 & 10 c
Taylor's Patent Petrolum.	dis 30 & 10 c
Wood and Metallic.	dis 40 c

Filings.

American Best.	\$5 00 to £ net
Nicholson-Mill.	5 00 to £ net
" Tapers (single cut).	5 00 to £ net
J. & Riley Carr's.	5 00 to £ gold
Butcher's.	8 00 @ 8 25 to £ gold
Spears & Jackson's.	5 00 to £ gold
Hargreaves	

Bar Iron from Store.

Common Iron.					
$\frac{1}{4}$ to 8 in. round and square.	\$ per ton \$100.00				
$\frac{1}{4}$ x 16 in.	105.00				
$\frac{1}{4}$ in.	107.50				
$\frac{3}{4}$ to 3 in.	105.00				
$\frac{1}{2}$ in. wide x $\frac{3}{4}$ and 1 in. thick.	105.00				
$\frac{1}{2}$ in. wide x $\frac{3}{4}$ & 5-16 in. thick.	105.00				
$\frac{1}{2}$ in. and 1 $\frac{1}{2}$ in. x $\frac{3}{4}$ and 5-16.	107.50				
wedish Iron.					
$\frac{1}{4}$ x $\frac{3}{4}$ and $\frac{1}{2}$.	\$ per ton 155.00				
$\frac{1}{4}$ x $\frac{3}{4}$ to $\frac{1}{2}$, and $\frac{1}{2}$ square.	150.00				
$\frac{1}{4}$ to $\frac{1}{2}$ in. to $\frac{1}{2}$ and $\frac{1}{2}$ in. square.	145.00				
6 to 12x $\frac{1}{2}$ and $\frac{1}{2}$.	155.00				
Refined Iron.					
$\frac{1}{2}$ to 2 in. round and square.	105.00				
1 to 6 in. wide x $\frac{3}{4}$ to 1 thick.	165.00				
$\frac{1}{2}$ to 6 in. wide x $\frac{3}{4}$ and 5-16 thick.	110.00				
and 1 $\frac{1}{2}$ in. x $\frac{3}{4}$ and 5-16.	112.50				
large Rounds.					
$\frac{1}{2}$ to 2 $\frac{1}{2}$ in. round and square.	122.50				
3, 3 $\frac{1}{2}$ and 3 $\frac{1}{2}$ in.	117.50				
8 $\frac{1}{2}$ and 4 in.	125.00				
Rods— $\frac{1}{2}$ and 1-16, round and square.					
$\frac{1}{2}$ and 8-16,	110.00				
7-16,	117.50				
$\frac{1}{2}$,	125.00				
5-16,	127.50				
$\frac{1}{2}$,	132.50				
3-16,	132.50				
and Iron.					
1 to 6 in. x 3-16 to No. 12.	122.50				
Horse Shoe Iron.					
$\frac{1}{2}$ and $\frac{1}{2}$ x $\frac{1}{2}$, to $\frac{1}{2}$.	127.50				
Ovals, Half Ovals and Half Rounds.					
$\frac{1}{2}$ to $\frac{1}{2}$.	\$ per ton 120.00				
$\frac{1}{2}$ and 1-16.	135.00				
$\frac{1}{2}$ and 9-16.	140.00				
7-16.	145.00				
$\frac{1}{2}$.	150.00				
Nail Rods					
UB.	\$ per lb.				
Norway Shapes					
$\frac{1}{2}$ to 2 in. x $\frac{1}{2}$ to $\frac{1}{2}$.	85¢				
$\frac{1}{2}$ to $\frac{1}{2}$ square	85¢				
Norway Bar.					
$\frac{1}{2}$ to 2 in. square.	75¢				
Spring Steel.					
1 to 4 in. wide.	100c				
The Steel					
$\frac{1}{2}$ to $\frac{1}{2}$ x $\frac{1}{2}$ & 5-16.	100c				
$\frac{1}{2}$ & 1 x 5-16.	110c				
Tee Calk Steel					
$\frac{1}{2}$ to $\frac{1}{2}$ x $\frac{1}{2}$ to $\frac{1}{2}$.	85c				
Flow Steel.					
$\frac{1}{2}$ to 16 wide.	90c				
leight Shoe Steel					
$\frac{1}{2}$ to 1 $\frac{1}{2}$ x $\frac{1}{2}$.	Stock.				
ops, $\frac{1}{2}$ x No. 22.	\$ per ton 175.00				
$\frac{1}{2}$ x No. 20.	145.00				
$\frac{1}{2}$ x No. 19.	137.50				
1 and 1 $\frac{1}{2}$ No. 18.	132.50				
$\frac{1}{2}$ to 2 and 1 $\frac{1}{2}$ x No. 18 & 14.	137.50				
Croll Iron— $\frac{1}{2}$ x12.	150.00				
$\frac{1}{2}$.	145.00				
$\frac{1}{2}$.	140.00				
$\frac{1}{2}$.	135.00				
$\frac{1}{2}$.	130.00				
$\frac{1}{2}$.	125.00				
$\frac{1}{2}$.	120.00				
$\frac{1}{2}$.	115.00				
Sheet Iron.					
English.	American				
Nos. 10 to 20.	85c	8c			
21 to 24.	75c	85c			
25 to 26.	75c	85c			
27.	75c	85c			
28.	8c	9c			
29.	85c	9c			
30.	85c	9c			
Galvanized, 10 to 20.	\$ per lb.				
21 to 24.	12c				
25 to 26.	12c				
27.	12c				
Patent Polished.	15c				
Russia.	Nos. 8 @ 11.	20c @ 22c			
"	Nos. 12 @ 16.	20c @ 22c			
Belgian.	15c				
One piece Corrugated Sheet Iron Elbows.					
CARBON IRON.					
45¢	5	55¢	6	7	inch.
85.75	4.25	5.25	5.25	6.50	per doz.
RUSSIA IRON.					
45¢	5	6	7	inch.	
87.00	0.00	13.00	13.00	14.00	per doz.
Brass.					
ROLLED AND IN SHEETS.					
(Brown & Sharp's Gauge.)					
For the purchase of 100 pounds and over at one time:					
HIGH BRASS.					
All Nos. to No. 28, and widths 14 in. and under.	40c				
All Nos. to No. 28, inclusive, and widths over 14 to 2 in. inclusive.	45c				
Over 20 in. to 30 in., inclusive.	45c				
Half-cent $\frac{1}{2}$ advance on each No. above No. 28 to 36, inclusive.					
All Brass thinner than No. 28 is Platers' Brass at .50c					
Sheets 34x45 in., and all sheets cut to particular sizes and lengths.	.40c				
Printers' Rules.	.50c				
Sheets wider than 30 in. and under 40 in.	.50c				
" 40 " and over.	.50c				
Circular sheets, in diam. from 4 in. to 14 inclusive.	.50c				
Circular sheets, in diam. over 14 in. to 30 inclusive.	.50c				
Circular sheets, in diam. over 30 in. to 40 inclusive.	.50c				
Circular sheets, in diam. over 40 in.	.50c				
LOW BRASS.					
4 cents $\frac{1}{2}$ more than High Brass.					
Gilding Metals, 7c. $\frac{1}{2}$ more than High Brass.					
Platers' or Gold-Metal Sawed.	.50c				
FOR SAWING: Metal in Width, 2 in. to $\frac{1}{2}$ in., to No. 30, inclusive, 1c. $\frac{1}{2}$ advance. 2 in. to 1 in., thinner than No. 30, 2c. $\frac{1}{2}$ advance. 1 in. to $\frac{1}{2}$ thinner than No. 30, 3c. $\frac{1}{2}$ advance. $\frac{1}{2}$ in. and less to No. 30, 2c. $\frac{1}{2}$ advance. $\frac{1}{2}$ in. and less thinner than No. 30, 5c. $\frac{1}{2}$ advance. 10¢ discount.					
SURFACE.					
Igh Brass Scrap, 20 cents, net.	.10c				
Low	.25				
Gilding, 75 cents, net.					
Turnings, Fillings and Chips, half the price of scrap, net.					

BRASS AND COPPER WIRE.

(Stub's Wire Gauge.)

Gild'g and

High Brass. Low Brass. Cop'r.

Nos. 0 to 20.

43

47

58

For each additional X add.

10¢ discount

FINE WIRE—NET PRICES.

Gil andd's

High Brass. Low Brass. Cop'r.

No. 26.

045

049

085

TERNE PLATE.

No. 27.

048

032

038

ZINC—DUTY:

Pig or Block, \$1.50 per 100 lbs.

Sheet, $\frac{1}{2}$ cents per pound. All subject to a reduction of 10 per cent.

Shee

open 10¢

Paper Stock, Old Metals, &c.

(Dealers' Selling Prices.)

Canvas Linen.

No. 1.

5 $\frac{1}{2}$ @ 67 $\frac{1}{2}$ @ 7 $\frac{1}{2}$

4

White Linen Rags.

No. 1.

6 $\frac{1}{2}$ @ 75 $\frac{1}{2}$

Colored

Mixed woolens.

Satin woolens.

Gum bagging.

Jute Bagging.

Kentucky Bagging.

Book stock.

Waste paper and scraps.

Rope cuttings.

Kentucky Bale rope.

Oakum junk, No. 1.

No. 2.

Grass rope.

Tarred Shaking.

Old Metal.

Copper.

Yellow metal.

Brass.

Old lead solid.

Tin lead.

Wrought Iron.

Sheet iron.

Cast iron.

Machinery iron.

Zinc.

Pewter.

Spelter.

Paints.

Black, lamp—Coach Paints.

Ordinary.

Ivory Drop, fair.

best.

Black Paint, in oil.

kegs, Sc, ass't'd cans, 10 $\frac{1}{2}$ c.

Blue, Prussian, fast to best.

in oil.

35 @ 65c

Chinee, dry.

Ultamarine.

Van Dyke.

Carmine, French.

Green, Chinese.

Burnt, Chinese.

Paraff.

in oil.

Mineral Paints.

Orange Mineral.

Red Lead, American.

English.

French.

Venetian (N. C.) dry.

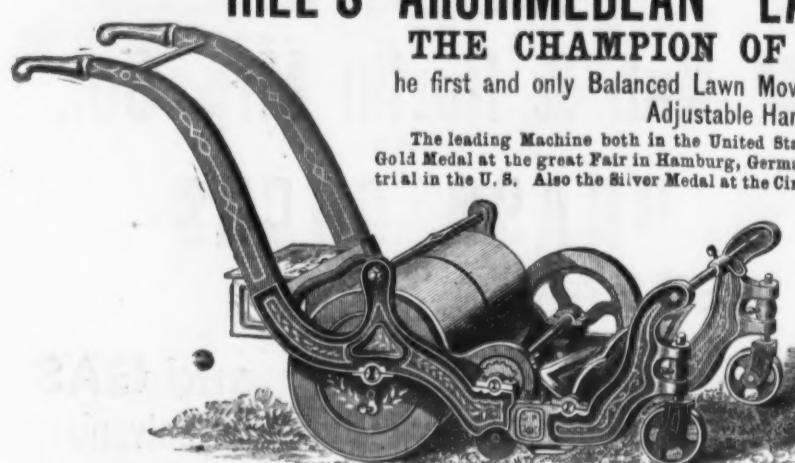
Indian, dry.

Rose Pink.

HILL'S ARCHIMEDEAN" LAWN MOWER. THE CHAMPION OF THE WORLD.

The first and only Balanced Lawn Mower made and operated by an Adjustable Handle.

The leading Machine both in the United States and Europe, having taken the Gold Medal at the great Fair in Hamburg, Germany, and the Premiums at every test trial in the U. S. Also the Silver Medal at the Cincinnati Exposition of 1872.



little Croquet Mower for small Lawns and Cemetery Lots, which is the most complete thing of its kind made, and is easily operated by a Miss of ten years. Our list is as follows:

10 inch Croquet Mower, for Miss, \$20.00.	14 inch, for Man	\$25.00.	
12 inch, for Boy	22.00.	28 inch, for Pony	100.00.
	32 inch, for one Horse	\$125.00.	

Send for circulars. Manufactured by the

Hills Archimedean Lawn Mower Co.,
Colts Armory, Hartford, Conn.
SEMPLE, BIRGE & CO., General Agents, West of the Mississippi, St. Louis, Mo.



So well known is this favorite Lawn Mower that it needs no introduction or recommendation. It has a greater reputation, and larger sale, both in the United States and Europe, than any Lawn Mower made, and the first and only one constructed upon those principles.

What we claim for it over others is ease of operating, durability, simplicity and evenness of its work.

We wish more particularly to call attention to the addition we have made to our list, of 2 sizes of Horse Mowers, and one beautiful

little Croquet Mower for small Lawns and Cemetery Lots, which is the most complete thing of its kind made, and is easily operated by a Miss of ten years. Our list is as follows:

10 inch Croquet Mower, for Miss, \$20.00.	14 inch, for Man	\$25.00.	
12 inch, for Boy	22.00.	28 inch, for Pony	100.00.
	32 inch, for one Horse	\$125.00.	

Send for circulars. Manufactured by the

Hills Archimedean Lawn Mower Co.,
Colts Armory, Hartford, Conn.
SEMPLE, BIRGE & CO., General Agents, West of the Mississippi, St. Louis, Mo.

The Improved Excelsior Lawn Mowers,

FOR HAND OR HORSE POWER, MANUFACTURED BY

CHADBORN & COLDWELL MANUFACTURING CO.

P. O. Box 479, NEWBURGH, N. Y.



No. 2	\$75	Width of Cut, 25 inches.	Grass Box,	Horse Boots, \$12 per set.
No. 3	125	30 "	\$10	12 "
No. 4	160	35 "	11	12 "
No. 5	200	40 "	12	12 "

No. 0 Hand Mower—Cuts 11 inches. Price, \$16.

No. 1 " " 14 " Price, \$25.

No. 2 " " 18 " Price, \$30.

The No. 1 for general use, and warranted. The No. 2 for large lawns—when smooth.

For Sale by all the leading Hardware, Agricultural Implement and Seed Stores, in this and foreign countries.

ASK for the EXCELSIOR and get the Best.



The Excelsior is simple and durable. The gearing securely incased and will not clog. Has a full roller, without which no machine is perfect. A ball ratchet—"noiseless"—needs no oiling. Adjustable wrought iron handle. Hangers secured by bolts. The front rollers to these are adjustable, to vary the height of cut. Open balance wiper—with steel knives—the only practicable means of securing strength and ease of draught. Patent iron handle, with attachment on each side of the machine—avoids the serious annoyance of a single wooden handle. The EXCELSIOR LAWN MOWER having been before the public for four years, and subjected to the most severe tests, the manufacturers feel warranted in asserting that for SUPERIORITY in simplicity of construction and durability it has no equal. It is important in either Horse or Hand Lawn Mowers, that their design should combine the greatest strength with least amount of metal; we therefore use only the very best material, together with good workmanship, enabling us to produce Lawn Mowers light in weight, of easy draught, and at a price within the reach of all.

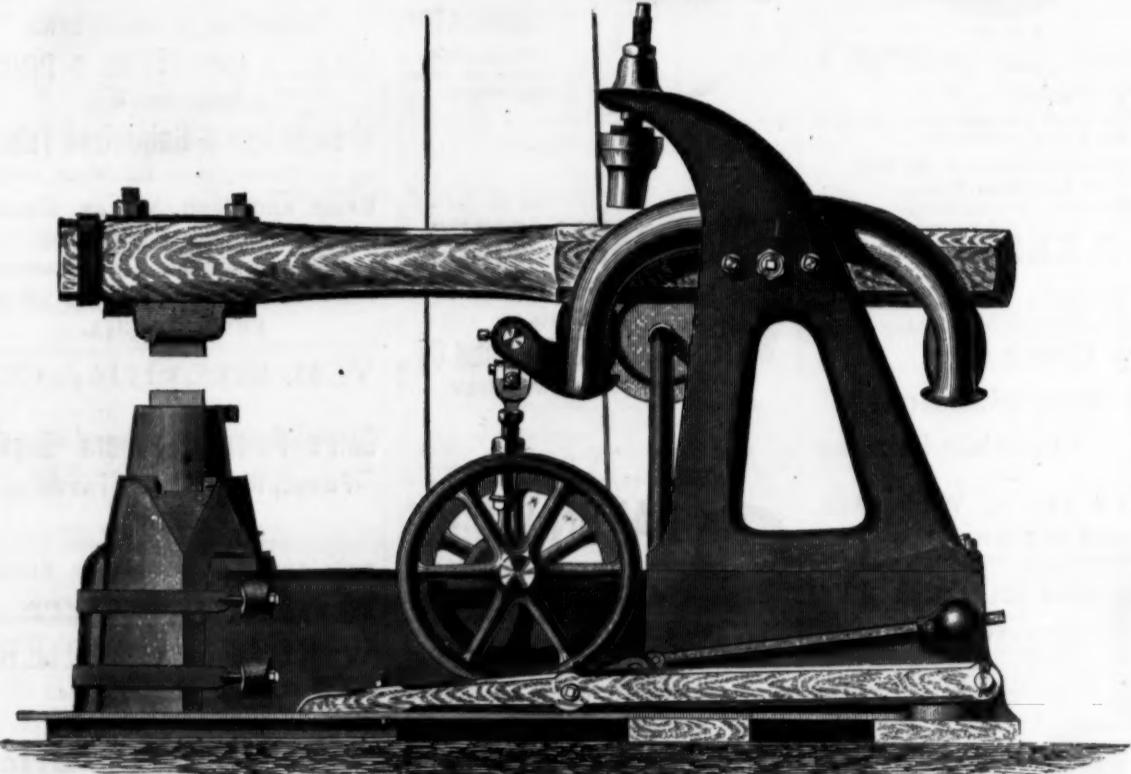
The EXCELSIOR has received the most favorable commendation from all, and the advantages claimed for it over other machines are fully appreciated wherever it is known. To this we add numerous testimonials, but the fact that our sales have greatly increased year by year, is the most convincing proof of its adaptation to the wants of the public.

GRAND SILVER MEDALS AWARDED THE EXCELSIORS AT THE

New England Fair, held at Lowell, Mass., Sept., 1871 and 1872; New Jersey State Fair, held at Waverly, N. J., Sept., 1871 and 1872; the first premium at the New York State Fair, 1871; Western New York Fair, 1871; Ohio State Fair, 1871 and 1872; Northern Ohio Fair, 1871 and 1872; Michigan State Fair, 1871 and 1872; Indiana State Fair, 1871; Wisconsin State Fair, 1871 and 1872; Tennessee State Fair, 1871; Virginia State Fair, 1871; South Carolina State Fair, 1871.

For description of Mowers, and particulars, send for catalogue. Agents wanted. A liberal discount to the trade.

BRADLEY'S CUSHIONED HAMMER.



This Hammer is a great improvement over the old style of helve hammers. It is all made of Iron and Steel except the helve and cushions. It is portable, takes up little room, and makes no other noise than the stroke of the hammer. It takes less power to drive it, and it turns out more and better work. The helve is nicely balanced upon two adjustable hardened steel centers, and there is no bind or friction connected with its action. It will endure more hardships at less expense for repairs, and, consequently, outlasts any other. Its capacity is greatly increased, but not at the expense of its size, convenience or durability. It strikes a more accurate, forcible and elastic blow than any other hammer. It is being used and is peculiarly adapted for the exceeding difficult work of swaging cotton spindles; no other hammer has been able to do this work as perfectly and economically. It is the favorite of every hammersman; it promptly obeys his every touch, and he soon regards it as a thing of life. We warrant them as recommended, and refer you to the following parties now using them:

W. H. Haskell & Co., Pawtucket, R. I.
Cole Brothers, Pawtucket, R. I.
American File Co., Pawtucket, R. I.
Fales, Jenks & Son, Pawtucket, R. I.
Providence Tool Co., Providence, R. I.
Nicholson File Co., Providence, R. I.
Woonsocket Iron Foundry, Woonsocket, R. I.
For particular address

John Berkenhead, Mansfield, Mass.
Steele & Conduit, Jersey City, N. J.
Silsby Mfg. Co., Seneca Falls, N. Y.
Cowling & Co., Seneca Falls, N. Y.
Rumsey & Co., Seneca Falls, N. Y.
Clapp, Fitch & Co., Auburn, N. Y.
Sweet, Barnes & Co., Syracuse, N. Y.

Warder, Mitchell & Co., Springfield, O.
Robert Doyle, Watseka, Ill.
Furst & Bradley Mfg. Co., Chicago, Ill.
Chicago Plow Co., Chicago, Ill.
Mark H. Richards, Pottstown, Pa.
Peters Bros. Mfg. Co., Marshall, Mich.
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BRADLEY MFG. CO., Syracuse, N. Y.

white Lead, &c.



Union White Lead Mfg. Company,
26 Burling Slip, New York.
B. W. HOW, Secretary. JAMES HOW, President.
MANUFACTURERS OF
White Lead, Red Lead, Litharge,
Orange Mineral.

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White Lead, Red Lead and
Litharge.
89 Maiden Lane, NEW YORK.
FISHER HOWE, Trs.

JOHN JEWETT & SONS
Manufacturers of the well known Brand of
WHITE LEAD.



TRADE MARK.
Also Manufacturers of
LINSEED OIL
AND FLOOR OIL CLOTHS,
182 Front Street, NEW YORK.



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The Atlantic White Lead and Linseed Oil Company,
MANUFACTURERS OF
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ROBERT COLGATE & CO.,
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No. 231 South Front St.,
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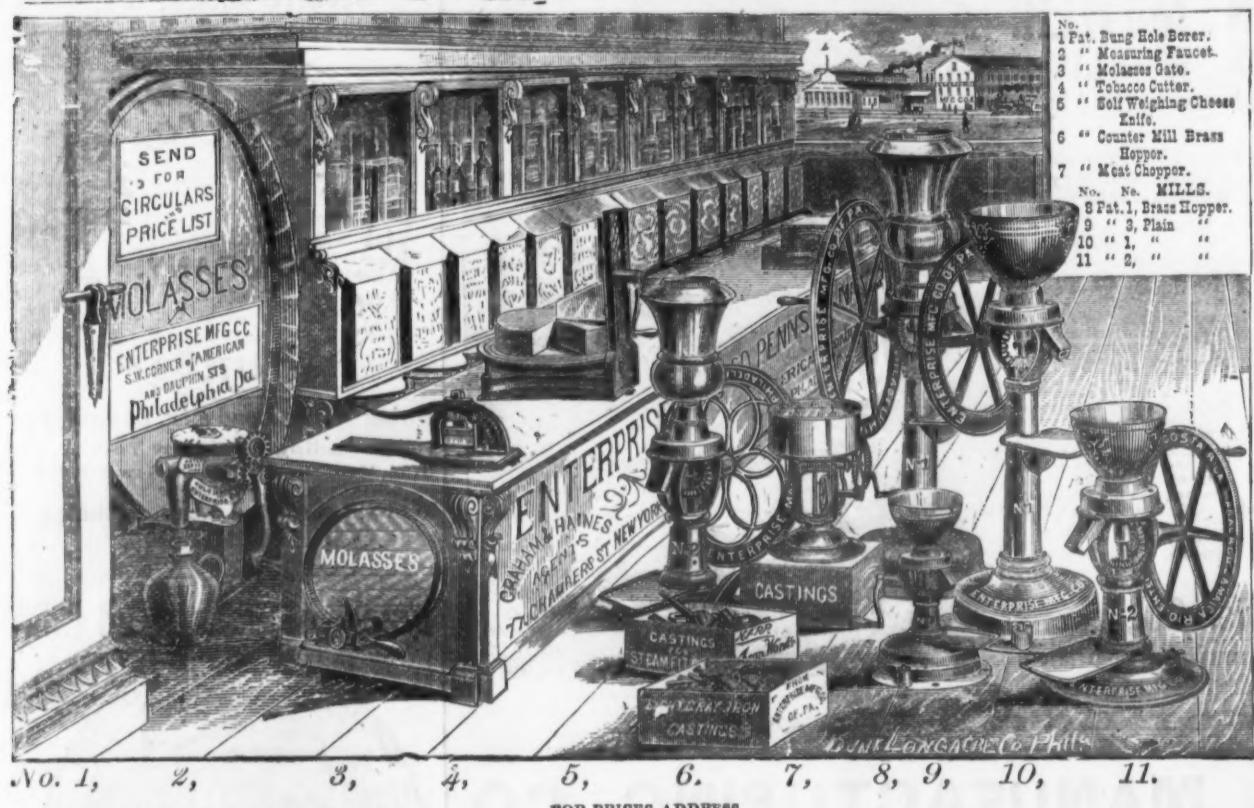
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MANUFACTURERS OF
PURE WHITE LEAD, RED LEAD,
Litharge, Orange Mineral,
Linseed Oil
AND PAINTERS' COLORS.



FOR SAMPLE CARDS.
Our Paint is made of the very best material known to painters, viz.: White Lead, Zinc and Linseed Oil, chemically combined, and is superior to any paint known to the trade. The advantages being that it is applied with less labor.
It shows a beautiful enamel surface.
It does not chalk or peel off.
It does not run from nail holes or corners.
It is fire proof and water proof.
It covers old work as well as new.
It is the best paint for iron buildings.
It is equal to any for covering brick.
It is a perfect wood preservative.
Run before dry, it is not wash it.
It is durable, retaining its enamel and freshness.
Sold by the Gallon only, in Cans or Barrels.
Office, 43 Chambers St., N. Y.



TRADE MARK.
Manufacturers
WHITE LEAD, RED LEAD,
LITHARGE, ORANGE MINERAL,
LINSEED OIL
AND PAINTERS' COLORS.

No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11.
FOR PRICES ADDRESS

ENTERPRISE MFG. CO., of Pa., or
HARDWARE MANUFACTURERS,
W. Cor. of American and Dauphin Sts., PHILADELPHIA.

CRAHAN & HAINES, Agents,
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SANDUSKY TOOL CO.,

MANUFACTURERS OF

Planes, Plane Irons, Carpenters', Cabinet Makers', and Coopers' Tools, Bench, Hand and Tail Screws,



SANDUSKY TOOL CO., Sandusky, Ohio, or GRAHAM & HAINES, 88 Chambers Street, N. Y.

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HAVE REMOVED

to 88 Chambers St., N. Y.

E. M. CHAPIN,

MANUFACTURER OF

RULES, PLANES, GAUGES,
Levels, Hand and Bench Screws, etc., etc.

Established in 1826 by H. Chapin.

Manufacturing Address,

H. CHAPIN'S SON,
PINE MEADOW, CONN.

RAZOR PASTE.

Having had repeated calls for our SUPERIOR COMPOSITION for Razor Straps, from residents in all parts of the country, we would give notice to our customers and the public generally, that we now issue it in separate form, and it may be obtained through the regular channels of trade.

Directions for use accompany each package. This article is carefully prepared from Original Recipe by

BENJAMIN F. BADGER,

Manufacturer of the

Genuine Emerson's Elastic Razor Strap,
CHARLESTOWN, MASS.

SMITH, BURNS & CO.,

Manufacturers of

Galvanized and Japanned Sheet Iron Goods and Tin Ware.

Coal Hods. Patent Stamped Corrugated Riveted Bottom.
Fry Pans. "Excelsior" Polished.
Excelsior Broiler. Best and Cheapest in the market.
Combined Chamber and Commode Pail,
Ash Cans, Galvanized and Japanned,
Galvanized Water Pails, Well Buckets,
Chamber Pails, Tea Kettles, &c., &c.
Toilet Sets. Fancy and Grained.
Chamber Pails, Slop Pails, Foot Tubs, Baths, Water
Carriers, Coolers, &c., &c.
Stamped and Piece Dish Pans and Plain Tin Ware.

Send for Illustrated Catalogue.

Warehouse, 45 Cliff Street, between Beekman and Fulton Streets, NEW YORK.



CAUTION.

BUY ONLY THE
GENUINE FAIRBANKS SCALES,
Manufactured by

E. & T. FAIRBANKS & CO.

**FAIRBANKS**

Standard Scales.

Stock Scales, Coal Scales, Hay Scales,
Dairy Scales, Counter Scales, &c.
Scales repaired Promptly and Reasonably.

For sale, also, Troemner's Coffee and Drug Mills,
Composition Bell, all sizes Letter Presses, &c., &c.

THE MOST PERFECT

ALARM CASH DRAWER.

MILES ALARM TILL CO.'S

EVERY

MERCHANT

SHOULD

Use them.

DRAWER

Warranted.

SOLD AT

FAIRBANKS' SCALE WAREHOUSES,

FAIRBANKS & CO.,

311 Broadway, N. Y.; 93 Main St., Buffalo, N. Y.

338 Broadway, Albany, N. Y.

Fairbanks, Brown & Co.,

118 Milk Street, Boston.

For sale by leading Hardware Dealers.

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ALARM CASH DRAWER.

MILES ALARM TILL CO.'

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Fairbanks, Brown & Co.,

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ALARM CASH DRAWER.

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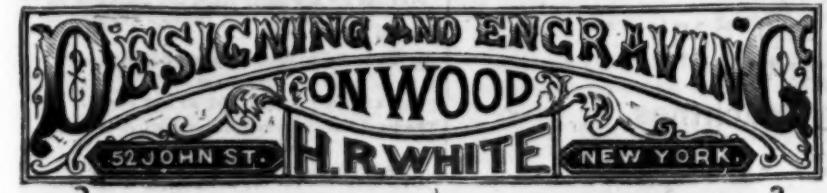
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IC. 12x12. Coke.	15 00	IX. 14x14.	29 00
IC. 12x12. Charcoal.	15 00	DIC. 100 Plate.	17 50
IX. 12x12.	17 50	DIC. 100 Plate.	17 50
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IX. 14x20.	18 50		

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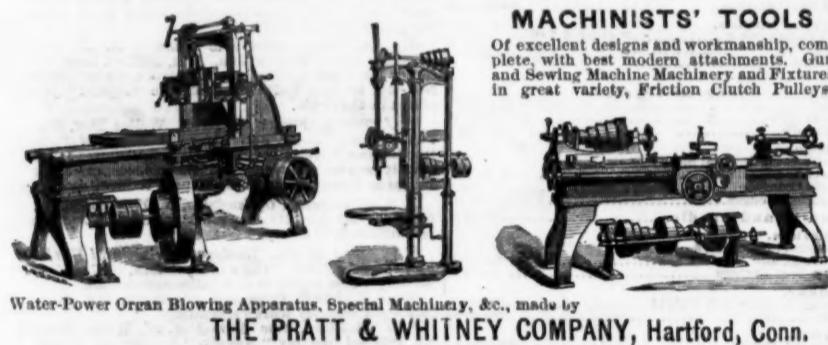
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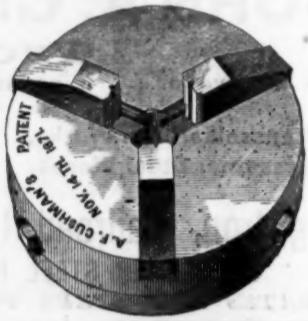
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Hoisting Machinery,
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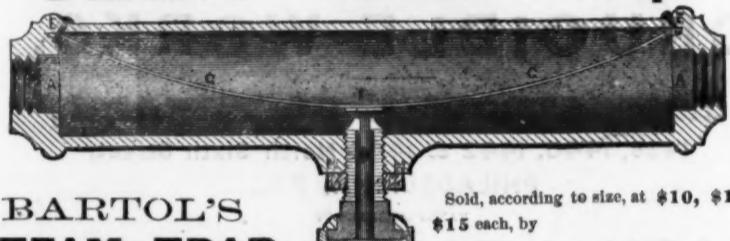
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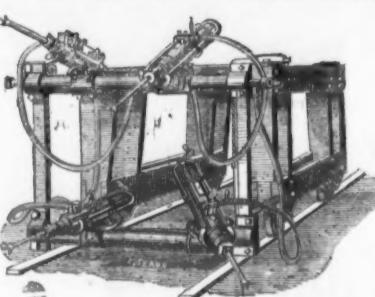
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Vertical Boilers, 2 to 30 Horse Power, constantly on hand.

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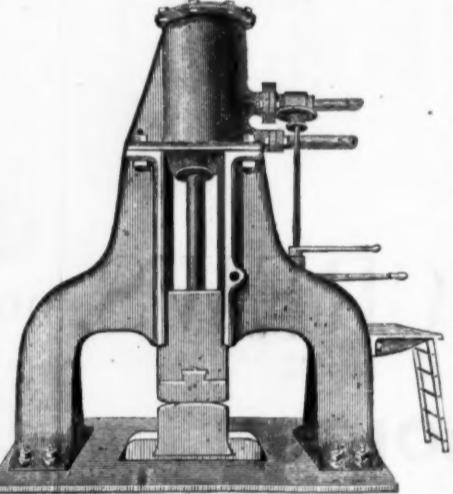
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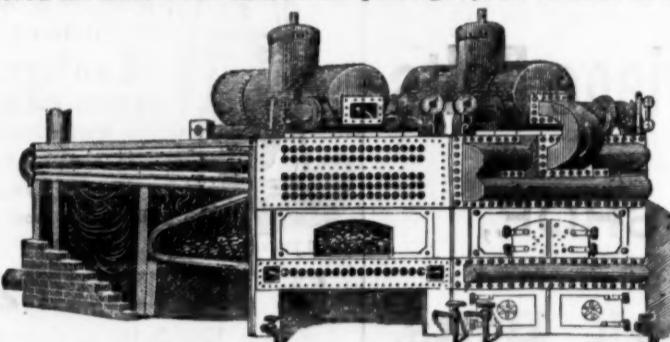
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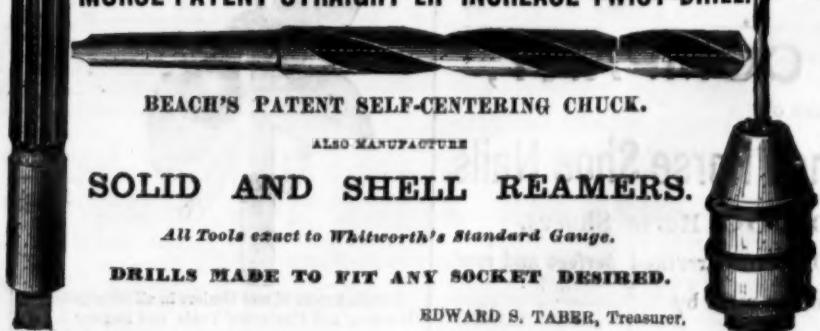
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